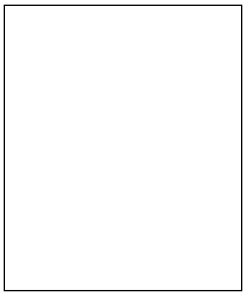
1995 IEEE International
Antennas & Propagation Symposium
and
URSI National Radio Science Meeting

Newport Beach California
Newport Beach Marriott Hotel and Tennis Club
Newport Beach California
June 18 - June 23, 1995

Contents

Chairman's Welcome



William Imbriale

On behalf of the Steering Committee, it is my pleasure to invite you to attend the 1995 IEEE Antennas and Propagation Society International Symposium and URSI National Radio Science Meeting. The Symposium will be held at the Newport Beach Marriott Hotel and Tennis Club, in Newport Beach, California, during the week of June 18-23, 1995. USNC/URSI Commissions A, B, D, E, F, G, and K will be participating. An interesting and informative technical program is being assembled by the Technical Program Committee, under the leadership of Dr. Ronald Pogorzelski. The technical program will all be conducted in the Marriott Hotel, providing convenient access to all sessions. In keeping with tradition, a number of Short Courses and Workshops are scheduled for Friday, June 23. A detailed listing of the course and workshop offerings is provided in the following material. You should also plan to visit the Industrial Exhibits, which will be open for three days, from June 20-22, located adjacent to the technical sessions.

We have put together what we hope will be an entertaining social program for you, your family, and friends. The organized activities are listed, and additional information on these and other local activities will be available at the Symposium. Two registration forms have been provided: one for the technical and social events, and the other for the hotel. We suggest that you register early, since all social events have limited enrollment, and will be filled on a first-come basis.

Make your visit to Newport Beach an extended vacation for your entire family! The Newport Beach Marriott Hotel and Tennis Club has all the facilities and amenities required for what promises to be both a successful Symposium and an enjoyable vacation. Newport Beach is a medium-sized community, with a charming and relaxing atmosphere. Located in Orange County, just south of Metropolitan Los Angeles, it is approximately fifteen minutes from the Orange County Airport, and approximately one hour from the Los Angeles International Airport. Rental cars, public transportation., and airport shuttle-buses make Newport Beach easily accessible.

Orange County and the Greater Los Angeles Area provide an unsurpassed assortment of recreational and educational opportunities for you and your family. The weather in June is extremely pleasant, and the area offers a variety of ways to enjoy the sun and the sea. Disneyland and other theme parks are located nearby, as are many museums, the California Angels and the Los Angeles Dodgers baseball teams, various movie and television studios, superb shopping centers, and countless fine restaurants.

Please come and enjoy the weather, shopping, social activities, and not least of all, a superb technical program.

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Acknowledgments

The Symposia Steering Committee is pleased to acknowledge the support of Northrop Grumman Corporation in arranging for the portfolio folders.

Symposia Location

The Symposia headquarters hotel is the Newport Beach Marriott Hotel and Tennis Club, 900 Newport Center Drive, Newport Beach, California 92660, USA. Telephone: (714) 640-4000; Fax: (714) 640-4918. All technical sessions, workshops, short courses, business meetings, exhibits, the reception, and the awards banquet will be held in the Newport Beach Marriott Hotel. Newport Beach offers a tropical setting along the Pacific Coast, with hundreds of outstanding and award-winning restaurants; it also offers easy accessibility, through the John Wayne/Orange County Airport. Attractions abound: from para-sailing, boating, and fishing, to the fun zone of Newport Beach.

Newport Beach Weather

Southern California's climate tends to be moderate throughout the year with balmy days and cool evenings. On most evenings, a jacket or sweater is recommended. The average daytime high temperature in June is 78 degrees F (25° C), and the average nighttime low temperature is 60 degrees F (15° C).

Transportation

Airlines

Carlson Travel Network / Tulip is your designated travel consultant. You will find knowledgeable and friendly service to locate the best available fares on any airline. Meanwhile, we have contracted with Delta Airlines as the official Symposia carrier. It offers the following:

(a) 10% discount on unrestricted coach fares
(b) 5% discount on excursion fares
(c) Zone fares are also available

Call Carlson Travel Network, between 9:00 a.m. to 5:00 p.m. PST, at (800) 669-6989 (international, call US (909) 591-3881). They will help you with any airline travel needs, and make sure you receive credit for frequent-flyer miles on your favorite airline. If you call Delta direct, you must mention Star #I3426 to receive discounts.

Car Rentals

Hertz rental-car discounts are available to attendees who make their reservations with Hertz directly at (800) 654-2240, or when you book your air and car with Tulip Carlson Network at (800) 669-6989. Be sure to mention CV-9565 to get the best rate, and try to reserve your car early. At the Orange County International Airport (John Wayne), the Hertz counter is located near the baggage-claim area. At the Los Angeles International Airport, Hertz counters are found in every terminal in the baggage-claim area, except for Terminal 3, where there is a courtesy phone. There is also a Hertz counter inside the Newport Beach Marriott Hotel, in the North Tower lobby. Reserve your car ahead, and pick it up at the hotel at your convenience.

Transportation from Orange County Airport and Los Angeles International Airport

Orange County Airport is located approximately 5 miles north of the Newport Beach Marriott Hotel. Free hotel shuttle service is available on an hourly basis, from 6:00 a.m. to 10:00 p.m., or you can call on a courtesy phone in the baggage-claim area. Taxi service from the airport is approximately $14 for two persons, plus $5 per person up to a five-person maximum. Los Angeles International Airport (LAX) is located approximately 45 minutes from the Newport Beach Marriott Hotel, and services international and domestic flights. Super Shuttle, operating 24 hours per day, is available. You can contract them on a courtesy phone in the baggage-claim area upon arrival, or advance reservations can be made by calling (800) 551-7488 in the US. The cost is presently $21 per person, one way. A taxi from LAX is $55 for two persons, with a five-person maximum.

Registration

Registration is required of all Symposia participants, including AP-S and URSI officials, session chairpersons, and authors. Workshops, short courses, awards banquet, and social events may be attended with the payment of additional fees, as indicated on the registration form. Spouses and family need not register for the Symposia to participate in the social programs but, of course, must register for the events of interest. The full Symposia registration fee includes admittance to the pertinent technical sessions and a copy of the pertinent digests, admittance to exhibits, and refreshments. Extra copies of the digests are available for purchase at the Symposium: the cost per set is $50.00 for the AP-S digest and $20.00 for the URSI digest.

General Information

Cancellation Policy

A $50.00 processing fee will be charged for registrations canceled prior to May 31. From June 1 to June 17, a 50% refund will be made. There will be no refunds after the conference begins, on June 18.

Registration Desk

The conference-registration desk, located at the Newport Beach Marriott Hotel, California Ballroom Foyer, North Wing, will open on Sunday, June 18, at 3:00 p.m., and will remain open until 8:00 p.m. that evening. It will re-open on Monday morning, beginning at 7:30 a.m. The registration desk will be staffed throughout the conference, to provide information and assistance to participants and their goals.

Lodging

A block of rooms has been reserved at the headquarters hotel, the Newport Beach Marriott Hotel and Tennis Club, at the group rate of $130 / single / double, plus state and city taxes. An additional block of rooms is reserved at the Hyatt Newporter, which is approximately 1.3 miles away from the Marriott. The conference rate at the Hyatt is $89. A hotel-reservation form is included in the advance program and on the following pages, and conference attendees are encouraged to register early, to insure their first choice of accommodations. If you choose to phone the Newport Beach Marriott Hotel or the Hyatt Newporter directly, *be sure to so indicate on your registration form*, and *remember to identify yourself as a participant in the IEEE/URSI Conference*, both to receive the group rates and to insure that your reservation is counted toward the conference minimum.

Parking at the Hotel

Both the Newport Beach Marriott and the Hyatt Newporter offer free parking for conference attendees.

Recreational Facilities

At the Newport Beach Marriott Hotel and Tennis Club, there are eight lighted tennis courts, a complete pro shop with snack bar and locker facilities, two swimming pools, two whirlpools, and a sauna / health club. The beaches are nearby, and there is ample opportunity for golf, water sports, jogging, and bicycling. Quaint upscale shopping, art galleries and dining are located across the street at Newport Fashion Island.

Sporting Events

A golf tournament will be held on Friday, at the Hyatt Newporter's nine-hole par-three golf course. A nominal fee will be collected for all participants. Trophies will be awarded to the winner and runner-up. A tennis tournament will be held in the late afternoons, beginning on Monday, at the Newport Beach Marriott Tennis Club. A nominal court fee will be collected. Trophies will be awarded to the winner and finalist. For more information, please call Michael Thorburn at (818) 354-1843.

Disability Accommodations

Disability accommodations are available. To obtain further information, call the hotel reservation desk at (714) 640-4000.

Digests

Digests will be distributed at the Pacific Ballroom Foyer.

Shipping Desk

A shipping desk will be available at the Newport Beach Marriott Hotel for those Symposia attendees who wish to mail digests.

Information Desk/ Message Center

For the convenience of Symposium participants, an information desk / message center will be located at the registration desk, California Ballroom Foyer, and it will be open during registration hours. The message phone number will be (714) 640-4000.

Exhibits

Industrial exhibits will be located at the Newport Beach Marriott Hotel. For further information or **if you are interested in exhibiting, please call Michael Thorburn at (818) 354-1843.**

Recruiting

Consistent with the new IEEE policies, a job bulletin board will be available, for attendees to post and review job opportunities. The bulletin board will be located in the same area as the industrial exhibits.

No Smoking

Smoking will *not* be permitted in the meeting areas or exhibit areas. Please also observe the smoking policies of the hotel and the State of California.

Further Information

For further information regarding local arrangements or exhibits, please contact Michael Thorburn at (818) 354-1843.

Social Events

A variety of activities has been arranged for the pleasure and enjoyment of registered attendees, and their spouses and guests. Bus times, given in the following activities calendar, are for departure from the Marriott Hotel, and arrival back. It is strongly recommended that attendees pre-register themselves and their guests for these events, since some of them have limited capacity and may sell out early. In order to pre-register, use the advance registration form, found elsewhere in this program and on the following pages. If you pre-register, your tickets will be included in the package that you will receive from the Symposium registration desk. Bus costs are included in the ticket prices. If a minimum enrollment is not obtained for a particular event, the program committee reserves the right to cancel the event and to provide a refund.

Daytime Activities

A hospitality room, for the convenience of spouses and guests of attendees, will be open from 8:15 am each day, from Monday, June 19, through Thursday, June 22, on the third floor of the Marriott Hotel. Coffee and pastries will be provided, and a hostess will be available to furnish local maps, brochures, and information concerning shopping trips, walking tours, and the Newport Beach area. For those who may not want a full eight-hour tour on Tuesday, please note that a second choice is offered. There is no charge for this service.

Monday, June 19 ***A Visit to Historic San Juan Capistrano***
10:00 am - 3:00 pm

About 20 miles down the coast from Newport Beach is the town of San Juan Capistrano, with its famous Mission, known for the return of the swallows each Spring. Built in 1776, by the intrepid Father Junipero Serra, it is a living example of California's Spanish heritage. You may visit the Mission, browse the shops on Camino Capistrano, and stroll historic Los Rios Street, before having lunch at the El Adobe Restaurant, a designated California Historical Landmark, dating from 1778. Returning via the Pacific Coast Highway, your motor coach will stop for a short visit in the artists' colony of Laguna Beach, with its abundance of boutiques, art galleries, and sidewalk cafes. **Price: $36 (including lunch).**

Tuesday, June 20 ***Universal Studios Tour***
9:00 am - 5:00 pm

Visit the world's largest movie studio, where pictures have been made since 1915. From an open-air tram, you will see hundreds of sets from famous motion pictures and TV shows of the past and present. You will experience the terror of an 8.3 magnitude earthquake, the horror of a face-to-face meeting with a 30-foot-tall King Kong, and an encounter with the dreaded shark from *Jaws*. You'll be amazed to see the special effects from such movies as *Backdraft*, *Back to the Future*, and *Star Trek*, and the daring feats of the stuntmen of the Riot Act Show. **Price: $60 for adults, $55 for children age 3 to 11 years (lunch not included).**

Tuesday, June 20 ***R.M.S. Queen Mary Tour***
10:00 am - 3:00 pm

The Royal Mail Ship Queen Mary, more than 1000 feet long and 12 decks high, is the centerpiece of the City of Long Beach waterfront. You will be able to enjoy a guided tour of this magnificent vessel, from stem to stern and from engine room to wheelhouse. Some of you will remember the 1981 Symposium Banquet that was held in the ship's First Class Dining Room. After the docent tour, you may browse the on-board shopping area, Piccadilly Circus, or go ashore to visit the boutiques of the Queen's Marketplace, along the promenade. There are several places, both on ship and ashore, where you may have lunch "on your own."

Price: $25 (lunch not included).

Wednesday, June 21 ***A Taste of Newport Beach***
11:00 am - 4:00 pm

There is no better way to see Newport than by water! The tour begins with a short bus ride to the Balboa Peninsula, separating Newport Yacht Harbor from the Pacific Ocean. Then, enjoy lunch at the Tale of the Whale Restaurant, located inside another California Historical Landmark, the Balboa Pavilion. Here you will have sweeping views up and down the beautiful harbor, home to more than ten thousand vessels, from small craft to luxurious yachts. Following lunch, you will board one of the Pavilion's boats for a 90-minute narrated harbor cruise around Balboa and Lido Islands, where you will see the homes and yachts of some of the "rich and famous." After the cruise, you will be free to enjoy the Balboa Fun Zone, with its arcades and amusements, or take a short walk across the peninsula and out on the Balboa Pier, over the blue Pacific. **Price: $31 (including lunch).**

Thursday, June 22 ***Disneyland***
9:00 am - 5:00 pm

Relish a visit to the original Disneyland, the happiest place on Earth! The park is noted for its great variety of rides and non-stop attractions, such as "Pirates of the Caribbean," "Space Mountain," "Star Tours," and the very latest, "Fastasmic." Mickey and Minnie and the Seven Dwarfs are still there, of course, waiting to be photographed with the children. Lunch will be on your own, at any one of the several restaurants in the park.

Price: $68 for adults, $60 for children age 3 to 11 years (lunch not included).

Evening Activities

Monday, June 19 **Reception**
6:00 pm - 8:00 pm

This is the time to join your colleagues, meet old friends, and make new ones. The reception will be held in the Atrium Court and the adjoining Pool and Rose Garden areas of the Marriott Hotel. Food will be served,. in the form of hors d'oeuvres, and each registrant will receive two complimentary beverage tickets, for use at any of the cash bars.

There is no charge for this happy event!

Tuesday, June 20 ***Beach Party and Barbecue at Newport Dunes***
7:00 pm - 10:00 pm

It doesn't get any more casual than this, and beach attire is entirely appropriate! The Dunes is a beach park, located on Upper Newport Bay, immediately adjacent to the Hyatt Newporter Hotel, about 1.3 miles distant from the Marriott. We'll have our own pavilion, roped off swimming area, and a couple of volleyball courts in the sand. Dinner will be served in buffet-barbecue style, and there will be a cash bar, where you may slake your thirst. **Price: $40 (including dinner)**

Wednesday, June 21 ***Awards Banquet***
6:00 pm - 11:00 pm

Traditionally, this is the event at which awards, honors, and presentations are bestowed upon deserving AP-S members, for their achievements and service to the Society. A pre-dinner social hour will be held in the Atrium Court and adjoining Pool and Rose Garden areas of the Marriott Hotel. Guests will then move to the hotel's Pacific Ballroom, for the banquet itself. There, you'll enjoy "The Peninsulans," an 18-piece big-band, specializing in the musical sound of the 1940s. They will provide soft music during dinner, but after the awards ceremonies, they'll break out and swing for your dancing pleasure. **Price: $55**

Short Courses

All held on Friday June 23, 1995, 8:30 a.m.-5:00 p.m.

Array Signal Processing Techniques Applied to Antenna Applications

Presented by Dr. Jerry Mendel, Signal and Image Processing Institute, University of Southern California
Fee: $175 ($200 after May 12)

This course will demonstrate how higher-order statistics, which involve an array of arguments in their calculations, can replace hardware with software; increase the effective aperture of an array, so that you can determine direction of arrival for many more targets than sensors; theoretically eliminate the effects of additive Gaussian and non-Gaussian noise; lead to fault-tolerant and reconfigurable arrays; and handle independent as well as coherent sources. Before you say, "This sounds too good to be true," attend this course to learn that it is, indeed, true.

Topics covered include: 1. Introduction to higher-order statistics; 2. Review of array-signal-processing models; 3. Cumulantbased blind beamforming; 4. Increasing effective aperture using cumulants; 5. Review of high-resolution methods for determining directions of arrival (MUSIC and ESPRIT); 6. Cumulant-based ESPRIT, Virtual ESPRIT (VESPA) for determining directions of arrival; 7. Cancellation of Gaussian and non-Gaussian additive noise; and 8. The case of coherent signals.

Photonics for Antenna Applications– An Introduction and Overview

Course Organizer: Michael L. VanBlaricum, Toyon Research Corporation
Fee: $175 ($200 after May 12)

Future generations of radar and communication systems will require designs with strict performance requirements; bandwidths of an octave or more; dramatic reduction in size and weight; low observability; and greater isolation from electromagnetic interference and crosstalk among hundreds to thousands of modules, subarray feeds, and elements. These requirements will drive innovative antenna-element and matching-network designs, antenna feeds, and control interfaces, as well as novel backplane interfaces and signal distribution techniques. Conventional metallic waveguides and coaxial cables will be unable to meet these stringent requirements. The use of photonics-based antenna feeds and links opens the possibility of unique, very-high-performance antenna systems, while meeting these future stringent requirements.

In this course we will present an overview of the use of photonics technology, fiber-optical guides, lasers, modulators, switches, detectors, and other optically controlled components for the distribution and control of analog RF signals in antenna, array, and electromagnetic-field sensor systems. We will introduce the different approaches to designing analog optical links, for transmitting RF signals to and from antennas. We will look at what drives system-performance parameters, such as gain, noise figure, and dynamic range, and we will discuss the current state-of the art of devices and components for building links, and look at future possibilities. Finally, we will present existing approaches for optical control of phased-array antennas, including true time-delay and optical phase control.

Slotted-Waveguide-Array Antenna Technology

Presented by Dr. Sembiam R. Rengarajan, Professor, California State University, Northridge and Dr. Lars Josefsson, Chief Scientist, Ericsson Radar Electronics, Sweden
Fee: $175 ($200 after May 12)

During the past decade, many advances have been made in accurate modeling of waveguide-fed slots, for coupling and radiation applications. The integral-equation / moment-method techniques have yielded accurate solutions to many problems. Analyses have led to good mathematical models, for coupling between radiating elements, coupling between coupling elements, and interactions between coupling and radiating elements. Many different elements have been analyzed, and design procedures have evolved to address requirements for modern, high-performance antennas.

Description: This one-day course will consist of lectures on significant topics of slotted-waveguide-array antenna technology. Fundamental concepts, essential to the design and analysis of such antennas, and recent advances in this technology, will be presented. Many modern applications, such as shaped-beam patterns, multiple-beam arrays, and dual polarizations, will be discussed. Analysis tools, such as integral equations and moment methods, will be presented.

Outline of topics:

- Slot model, theory and experiments
- Narrow-wall and ridge-waveguide slots
- Compound and transverse slots
- Probe / Iris-excited slots
- Resonant and Traveling-wave feeds
- Flat-plate antennas and phased arrays
- Weakly excited slots
- Multiple-beam arrays
- Dual polarization
- External structures (baffles, horns, etc.)
- Dielectric-covered slots
- Synthesis and analysis procedures
- Coupling slots
- Manufacturing techniques
- Beam Shaping
- Radial-waveguide feeds
- Higher-order-mode coupling
- Edge diffraction
- Radar cross section
- Spectral-domain solutions

Application of Finite-Element Methods to Electromagnetics

Course Organizer: John L. Volakis, Professor, University of Michigan, Ann Arbor
Fee: $175 ($200 after May 12)

The goal of this one-day short course is to introduce the finite-element method (FEM), and its applications to electromagnetics, i.e. antenna scattering, microwave circuits, and propagation. The course will begin with an introduction to the basis of the technique itself. We will discuss shape functions, elements, system construction and assembly, storage schemes, mesh termination, and iterative solvers. Subsequently, different applications of the method to two and three dimensions, with emphasis on how the method is implemented, will be presented. A number of implementations will be discussed, including hybridizations of the FEM with ray techniques and the moment method. The finite- element-boundary-integral method will be presented, in connection with a variety of applications to planar and doubly conformal antennas, arrays, and microwave structures. Also, different types of absorbing-boundary conditions (ABCs), for two- and three-dimensional-mesh truncations, will be extensively discussed, in connection with implementations for scattering computations, radiation, and propagation problems. Large-scale simulations and parallelization issues will be addressed, and several successful implementations of the finite-element-ABC method, as well as code performance on parallel architectures, will be presented. Other local-mesh-truncation schemes (i.e., artificial absorbers, numerical ABCs, perfectly absorbing layers), and their success in connection with specific applications, will be also discussed. The attendees will receive a detailed course pack, covering all course material.

Hybrid Finite-Element–Method-of-Moments Technique for Electromagnetic Prediction of Complex 3D Curvilinear Geometries

Presented by Dr. George Antilla, Northrop Grumman Corp., Pico Rivera, CA
Fee: $175 ($200 after May 12)

This short course will provide a background and detailed development of the hybrid finite-element–method-of-moments technique, on three-dimensional curvilinear geometries. The course will cover the finite-element method, the surface method of moments, and the marriage of the two methods in the hybrid approach. The implementation of the method on curvilinear geometries will be emphasized, and the advantages and disadvantages of the approaches will be highlighted. The difficulty involved in meshing very general bodies with surface and volume elements will be discussed, and various approaches with unstructured meshes, to ease the burden, will be covered. Special features which enhance or explain the capabilities of the hybrid FEM-MOM approach will be covered. These features include antenna feeds and loads, impedance sheets and IBC, anisotropic/ inhomogeneous materials, hybrid sparse-dense matrix solvers, and the Rohklin-matrix-multiply speed-up for iterative solutions. Extensive code-validation results will be given, to show the accuracy of the method, including several antenna-input-impedance and absolute-gain predictions on complex-dielectric antennas.

Communication-Satellite Antennas: System Architecture, Technology, and Testing

Presented by: Dr. R. B. Dybdal, The Aerospace Corporation, Los Angeles CA
Fee: $175 ($200 after May 12)

Satellite-communication systems have had a long and successful history of operation, and face new challenges as the demand for extended service continues. This short course has three fundamental objectives. The first objective is to provide an overview of communication-satellite systems and their design. An understanding of the overall system, including space and ground segments, and their design requirements, is believed fundamental to appreciating the role of any component technology. In addition to describing the overall requirements for communication satellites, topics in this part include linear-repeater, regenerative-repeater, and digital-transponder designs, link performance, modulation and multiple access techniques, and millimeter-wavelength-propagation limitations. The second objective is to describe antenna technology for communication-satellite systems in detail. Topics in this part include earth- and spot-coverage beams, multiple-beam designs, adaptive-interference uplink designs, active-aperture downlink techniques, crosslink designs, broad-coverage designs for TT&C applications for the space segment, and terminal antennas and their pointing. The third objective is to describe testing techniques, needed in evaluation of these systems. Test techniques must be devised for the development, qualification, and on-orbit phases. Test-facility requirements, typical designs, and the techniques will be included in this discussion.

Terrestrial Personal Communications Systems

Presented by: Kazimierz (Kai) Siwiak, Motorola Paging Products Group
Fee: $175 ($200 after May 12)

Terrestrial radio communications can be characterized by three distinct antennas and propagation problems: fixed site antennas interacting with local scatterers, urban radiowave propagation, and small antenna proximate to the body. These three problems form the basis for the investigation of the personal communication path link in messaging systems. This short course has the objective of providing an overview of terrestrial radio system, focusing particularly on non-voice systems. Some of the aspects of antennas and propagation that are specific to terrestrial personal communication systems, and examples of a radio system design will be presented.

Description: This course includes (1) a historical perspective of terrestrial communications systems, (2) antenna employed at fixed sites in a telecommunications infrastructure, (3) an overview of the radio frequency spectrum in view of potential applications to personal communications, (4) urban and suburban radiowave propagation, (5) wave behavior in multipath environments, (6) the fundamental properties and limitations of small antennas particularly when they are proximate to the user, (7) communications in a wide-area simulcasting environment, and (8) an investigation of some of the special problems associated with personal communications using an earth orbiting satellite infrastructure.

Workshops

Design Approaches for Integrated-Circuit-Antenna Modules

June 23, 1995, 8:30 a.m.-5:00 p.m.

Organizers: Professor K. C. Gupta, University of Colorado
and Professor Peter Hall, University of Birmingham, UK
Speakers:
Professor Tatsuo Itoh, UCLA
Professor K. C. Gupta, University of Colorado
Professor Peter Hall, University of Birmingham, UK
Professor Melinda Piket-May, University of Colorado
Professor Albert Papiernik, University de Nice, France
Fee: $175 ($200 after May 12)

Integration of microwave circuits and antennas into single modules has been made possible by common technological features of microwave-integrated circuits and printed-microstrip antennas. This innovation represents a significant step in further miniaturization of RF and microwave modules, for a variety of applications, including active-phased arrays and wireless-communications systems. Traditionally, microwave-circuit designers and antenna designers have used different types of design tools for their designs. However, the design of integrated-circuit-antenna modules calls for concurrent design of both the circuit and the antenna functions. This calls for a new set of design tools, applicable to both the domains, or hybrid combinations of tools so far used separately, for circuit and antenna design. This workshop will discuss various design approaches, applicable for integrated-circuit-antenna modules. Both approximate and rigorous approaches will be presented. These include network models (transmission-line model and multiport-network model) for microstrip antennas, and their possible incorporation in microwave-CAD software, as well as approaches that link circuit simulators (like SPICE) with numerical-electromagnetic solvers (based on, for example the FTDT method.) Discussion will bring out areas of research and development needed in this field.

Intellectual Property Workshop

June 23, 1995, 8:30 a.m.-5:00 p.m.

Instructors: Phil Virga and Albin Gess
Fee $100 ($125 after May 12)

This workshop will provide an overview of intellectual property, namely patents, trademarks, copyrights, and trade secrets. It is intended primarily for engineers and scientists engaged in research and development activities, and for those business persons engaged in planning and managing industrial enterprises in which intellectual property plays a role. The workshop will present, in broad, general outlines, the fundamental principles and philosophy of the laws respecting "intellectual property," for the purpose of pointing the way to more-effective protection and exploitation of ideas and inventions. The workshop will include the topic of protecting computer software, with an overview on software-licensing

agreements. Additionally, the ownership of inventions and works of authorship produced by "Hired Third Parties," as well as designing around valid patents, will be addressed. The presenters for this workshop are practicing, registered Patent Attorneys, having extensive legal experience, with wide-ranging technical backgrounds based on education and work experience.

Lunchtime Panel Session: Wideband Vivaldi-Notch Antennas and Arrays

Tuesday, June 20, 1995, through lunch

Organizers: Dr. Shashi Sanzgiri and Professor Daniel H. Schaubert
Fee $25 ($35 after May 12)
A box lunch is provided.

Vivaldi-notch antennas were proposed two decades ago, for wide-band, wide-scan arrays. Although many successful designs have been demonstrated, these antennas have not yet fulfilled their original promise of providing trouble-free operation over multiple octaves and wide scan angles. Designers often encounter anomalies that interrupt otherwise well-behaved performance. No generally accepted design rules have appeared, and few guidelines are available to aid in the development of successful arrays. Single elements, however, are usually easier to design and fabricate, and they can produce a range of beamwidths, depending on antenna parameters. This panel session will explore some of the successes and failures associated with Vivaldi-notch antennas, with the primary objective of assessing the present state of the art, and the most-fruitful areas for future exploration, in order to make the design of wide-band, wide-scan arrays more systematic and reliable. CAD modeling is a relevant topic, but the panel session will focus on the physical performance of the antennas, rather than the numerical tools that may be helpful in assessing that performance.

Meetings

Sunday, June 18

9:00 AM	11:00 AM	APS Past President's Council
1:00 PM	6:00 PM	APS AdCom Meeting
6:00 PM	7:00 PM	APS AdCom Cocktails
7:00 PM	9:30 PM	APS AdCom Dinner

Monday, June 19

7:30 AM	8:00 AM	Morning Devotion
12:00 NOON	1:30 PM	APS Antenna Measurements Committee Luncheon
12:00 NOON	1:30 PM	APS Antenna Standards Committee Luncheon
12:00 NOON	1:30 PM	APS Transactions Editors Luncheon
5:00 PM	6:00 PM	URSI Commission B Business Meeting

Tuesday, June 20

7:30 AM	8:00 AM	Morning Devotion
12:00 NOON	1:30 PM	APS Magazine Staff Luncheon
12:00 NOON	1:30 PM	Propagation Standards Committee Luncheon
5:00 PM	6:00 PM	URSI Commission D Business Meeting
5:00 PM	6:00 PM	URSI Commission K Business Meeting

Wednesday, June 21

7:30 AM	8:00 AM	Morning Devotion
12:00 NOON	1:30 PM	Plenary Speakers Luncheon
12:00 NOON	1:30 PM	Transactions Reviewers Luncheon
5:00 PM	6:00 PM	URSI Commission F Business Meeting

Thursday, June 22

7:30 AM	8:00 AM	Morning Devotion
12:00 NOON	1:30 PM	APS Chapter Chairs Luncheon
12:00 NOON	1:30 PM	IEEE Press Liaison Luncheon

Friday, June 23

8:30 AM	1:00 PM	Kildal Meeting

HONORARY LUNCHEON

12:00 NOON	1:30 PM	Honorary Luncheon: Irene Peden

(There is a $30.00 fee for this luncheon; Payment and a reservation should accompany your conference registration form. Please note that this event was not itemized on the registration form at time of publication.)

Antennas and Propagation Society 1995 Awards

Distinguished Achievement Award

Akira Ishimaru

for Fundamental Contributions to Electromagnetic Wave Propagation

Schelkunoff Best Paper Prize

Thorkild B. Hansen
Arthur D. Yaghjian

for the paper "Planar Near Field Scanning in the Time Domain", Sept. 1994

Wheeler Best Applications Paper Prize

Lawrence I. Williams
Yahya Rahmat-Samii
Robert G. Yaccarino

for the paper "The Bi-Polar Near-Field Measurement Technique, Part I: Implementation and Measurement Comparisons", Feb. 1994

R. W. P. King Prize

Ramakrishna Janaswamy

for the paper "A Fast Finite Difference Method for Propagation Predictions over Irregular, Inhomogeneous Terrain", Sept. 1994

Newly Elected Fellows

Louis J. Ippolito, Jr.
Per-Simon Kildal
Raymond Luebbers
Ronald J. Pogorzelski
Helmut E. Schrank
Eric K. Walton

Scattering I

Chairs: R. J. Marhefka and W. C. Chew

8:20 UTD Diffraction Coefficient for Dielectric Plate Junctions
Ronald J. Marhefka, The Ohio State University*

8:40 SAF Analysis of Shipboard Antenna Performance, Coupling, asnd Radhaz in Complex Hear-Field Scattering Environments
B. J. Cown, GEMTECH Microwaves, Inc., J. P. Estrada, Georgia Tech

9:00 Scattering from a Conducting Cylinder Shielded with a Dielectric Bead
Kaveh Heidary, Matrix Technologies, Jay K. Lee, Arlon T. Adams, Syracuse University*

9:20 Electromagnetic Scattering From Corrugated Cylinders
G. Manara, A. Monorchio, Univ of Pisa, G. Pelosi, R. Coccioli, Univ of Florence*

9:40 Reduction of TM-Scattering From a Conducting Cylinder by Multiple Surface Impedance Loadings
Yin HongCheng, Ruan YingZheng, Deng ShuHui, University of Electronic Science and Technology of China*

10:00 BREAK

10:20 Fast Far Field Approximation for Calculating the RCS of Large Objects
C-C. Lu, W.C. Chew, University of Illinois*

10:40 The Mode Matching Technique for Electromagnetic Scattering by Cylindrical Waveguides with Canonical Terminations
Hristos T. Anastassiu, John L. Volakis, University of Michigan*

11:00 Overlapping Geometric and Modal Symmetries in Jet Engine Scattering and Modulation
Daniel C. Ross, John L. Volakis, Hristos T. Anastassiu, University of Michigan*

11:20 Physical Optics Analysis of Rotating Blades in a Cylinder
K. K. Chan, Chan Technologies Inc., F. Tremblay, S. Laird, Defence Research Estb. Ottawa*

11:40 Mode Matching Analysis of Metallic Blades in a Cylinder
K. K. Chan, Chan Technologies Inc., F. Tremblay, Defence Research Estb. Ottawa*

12:00 A Two Dimensional Shapedbeam Antenna
Lu Jiaguo, Tan Jizhao, Wan Xiaogang, East China Research Institute of Electronic Engineering

Finite Elements

J. Volakis and V. Jamnejad

8:20 Triangular Prisms for Edge-Based Vector Finite Element Analysis
Tayfun Ozdemir, John L. Volakis, University of Michigan

8:40 Higher-Order Vector Finite Elements for Tetrahedral Cells
J. S. Savage, A. R. Peterson, Georgia Institute of Technology*

9:00 The Dispersive Behavior of Triangular Edge Elements in the Finite-Element Method
Gregory S. Warren, Waymond R. Scott, Jr., Georgia Institute of Technology*

9:20 Domain Decomposition Eigenvalue Solver for Finite Element Mode Computation in Air-inlet
A. Barka, A. Cosnuau, F. X. Roux, ONERA

9:40 Analysis of Electromagnetic Transmission through a Choke using FE-BIM with Arbitrary Incidence Angle / Polarization
Eungsu Kim, Byungsung Kim, Sangwook Nam, Seoul National University

10:00 BREAK

10:20 Eliminating Spurious Solutions of Dielectric Waveguides: Computational Performance of the Reduced Integration Penalty Method
M. B. F. Chaves, LNCC - CNPq, C. G. Migliora, CETUC - PUC/Rio, H. J. C. Barbosa, LNCC - CNPq, Rio de Janeiro*

10:40 Investigation of Adaptive Absorbing Boundary Condition for Finite Element Solution of Three-Dimensional Scattering
Jian-Ming Jin, Ninglong Lu, University of Illinois*

11:00 Electrostatic Solution for Three-Dimiensional, Arbitrarily-Shaped Conducting Bodies Using FE-MEI
John H. Henderson, Auburn University

11:20 Two Novel Schemes for Truncating Finite Element Meshes
Jian Gong, John L. Volakis, University of Michigan*

11:40 Comparative Evaluation of Absorbing Boundary Conditions Using Green's Functions for Layered Media
M.I. Aksun, Bilkent University, G. Dural, Middle East Technical University*

12:00 An Implicit Finite Element TIme-Domain Method With Unconditional Stability

Umesh Navsariwale, Stephen D. Gedney, University of Kentucky*

Monday AM AP Session 3 Salon 4

Adaptive Antennas I

R. J. Mailloux and Y. Karasawa

8:20 Experiment with a Multibeam DBF Antenna Mounted on a Vehicle by Receiving a Satellite Signal
R. Miura, T. Tanaka, I. Chiba, A. Horie, Y. Karasawa, ATR Optical and Radio Communications Research Lab*

8:40 ASIC Implementation of DSP for Beam Space CMA Adaptive Array Antenna in Mobile Communications
T. Tanaka, R. Miura, I. Chiba, Y. Karasawa, ATR Optical and Radio Communications Research Lab*

9:00 Covariance Matrix Augmentation to Produce Adaptive Array Pattern Troughs
R. J. Mailloux, Rome Laboratory, Hanscom AFB

9:20 Direction Finding with Compensation for a Near Field Scatterer
Edward Michael Friel, Krishna Murthy Pasala, University of Dayton*

9:40 An Optimum Radar Signal Detector Using Orthogonal Projection
Y. H. Kim, S. T. Kim, Samsung Electronics, J. Lee, University of Inchon, K. M. Kim, D. H. Youn, Yonsei University*

10:00 BREAK

10:20 Performance Analysis of Antenna Array in Terms of SNR / SIR and Number of Antenna Elements
D. Yun, S. Choi, Hanyang University*

10:40 Superbroadband Full Azimuth Coverage Polarization Surveying Array
Liang Tiesheng, Feng Yan, Electromagnetic Science Institute*

Monday AM AP Session 4 Salon 5

Space Antennas and Arrays

M. Herman and T. Milligan

8:20 A Comparison Between Reflector and Active Array Satellite Antennas With Contour Beams
Erik Lier, Alan Cherrette, Martin Marietta Astro Space*

8:40 A Study of Sidelobe Suppression of Active Array Satellite Antennas with Contour Beams
Erik Lier, Alan Cherrette, Martin Marietta Astro Space*

9:00 Passive EVA Tracking System Using a Pair of 3-Element Microstrip Patch Arrays
B. Bourgeois, D. Arndt, I. Paz, M. Chavez, NASA Johnson Space Center*

9:20 A Study on the Isolation Capability of Multi-Beam Reflector Antennas
H-H. Viskum, TICRA, K. Tjonneland, INTELSAT*

9:40 Array Fed Contoured Beam Antenna Optimization With Frequency Variable Excitations
J. Uher, S. Richard, Spar Aerospace Ltd.

10:00 BREAK

10:20 Compact Dual Band Feed for Mars Global Surveyor
T. Milligan, Martin Marietta Astronautics*

10:40 Design and Optimization of a Compact Ka-Band Antenna Diplexer
J. Esteban, J.M. Rebollar, Universidad Politecnica de Madrid*

11:00 A Novel Compact OMJ for Ku-Band Intelsat Applications
Walter Steffe, Alenia Spazio

11:20 An Elliptical Corrugated Horn Model for Radiation Pattern Predictions
Erik Lier, Martin Marietta Astro Space

11:40 A Practical Method to Design a Corrugated Horn for Radiometric Applications
Peter Foldes, Foldes Inc., Fabio Massimo Marinelli, Alenia Spazio

Monday AM AP Session 5 Salon A

Broadband Antennas
C. A. Balanis and G. S. Smith

8:20 Transmission and Reception of Pulsed Signals Using Wideband Exponentially Tapered Slotline Antennas
Cam Nguyen, C. L. Lau, T. Scullion, Texas A&M University*

8:40 Linearly Tapered Slot Antenna Impedance Characteristics
Rainee N. Simons, Richard Q. Lee, NASA Lewis Research Center*

9:00 The Flared Coplanar Waveguide Traveling Wave Antenna
W.E. McKinzie, T.L. Anderson, Northrop Grumman*

9:20 Multi-Octave Phased Array for Circuit Integration using Balanced

Antipodal Vivaldi Antenna Elements
J. D. S. Langley, P. S. Hall, The University of Birmingham, P. Newham, Marconi Defence Systems*

9:40 On the Characteristic Impedance of TEM Horn Antennas
James G. Maloney, Georgia Tech Research Institute, Glenn S. Smith, Georgia Institute of Technology*

10:00 BREAK

10:20 EQUIANGULAR MICROSTRIP SPIRAL ANTENNAS
Shih-Chang Wu, New Jersey Institute of Technology

10:40 An Eccentric Sprial Antenna Printed on a Dielectric Substrate
K. Hirose, Shonan Institute of Technology, H. Nakano, Hosei University

11:00 Wideband Circularly-Polarized Rhombic Loop Antennas with Different Feed Models
H. Morishita, T. Iizuka, National Defense Academy, K. Hirasawa, University of Tsukuba, T. Nagao, National Defense Academy, Japan*

11:20 A Comparison of Several Broadband Loaded Monopoles for Pulse Radiation
Thomas P. Montoya, Glenn S. Smith, Georgia Institute of Technology*

11:40 An Approximate Modal Solution to the Ultra-Wide-Band Bowtie Antenna
Qiang Zhang, Nanjing Research Institute of Electronics Technology

Monday AM AP Session 6 Salon D

Time Domain Numerical Methods (FDTD) I
Jeffrey L. Young and Magdy F. Iskander

8:20 Another New FDTD Method for Linear Dispersive Media - But This One's the Best Yet
Steven A. Cummer, Stanford University

8:40 Frequency-Dependent FDTD Method Applied to Optically-Controlled Dielectric Waveguide
R.G. Farias, Federal Unviersity of Para, A.J. Giarola, State University of Campinas*

9:00 Dispersion Analyses of FDTD Schemes Associated with Dispersive Media
J.L. Young, A. Kittichantphayak, Y.M. Kwok, D. Sullivan, University of Idaho*

9:20 FDTD Simulation of High-Intensity, Ultrashort Laser Pulses for X-ray Generation
Dennis Sullivan, University of Idaho

9:40 Obtaining High-Performance Time-Domain Characteristics from

Calculated S-Parameters for Various Electronic Package and Interconnection Structures
Paul C. Cherry, Magdy F. Iskander, University of Utah*

10:00 BREAK

10:20 TEM Horn Antenna for Pulse Radiation: An Optimized Design
Kurt L. Shlager, Glenn S. Smith, GIT, James G. Maloney, Georgia Tech Research Institute*

10:40 3D Sub-Gridding Algorithm for FDTD
M. Okoniewski, E. Okoniewska, M. A. Stuchly, University of Victoria*

11:00 An Improved FDTD Method for Analysis of Higher Order Modes High Q Dielectric Resonators
C. Wang, H-W. Yao, K. Zaki, University of Maryland*

11:20 A Circular Mesh Scheme for the Non-Orthogonal Finite Difference Time Domain Method
P.Y. Chung, C. Wu, McMaster University, E.A. Navarro, Universitat de Valencia, J. Litva, McMaster University*

11:40 An Efficient Source Formulation for the Analysis of Microwave Circuits Using the FDTD
Achim Bahr, Institut fur Mobil-und Satellitenfunktechnik, Andreas Lauer, Ingo Wolff, Gerhard-Mercator-Universitat

Monday AM AP Session 7 Salon F

Nearfield Measurements
S. Blanch and O. M. Bucci

8:20 Phaseless Bi-Polar Near-Field Measurements Using a Two-Plane Squared Amplitude Interpolation Algorithm
R.G. Yaccarino, Y. Rahmat-Samii, UCLA*

8:40 Absorber-Loaded Planar Waveguide Array Antenna for Compact Range Application
Katsumasa Miyata, Akita National College of Technology

9:00 Efficient Near-Field - Far-Field Transformation with Cylindrical Scanning by a Finite and Non Redundant Number of Data
O.M. Bucci, Universita di Napoli, C. Gennarelli, G. Riccio, V. Speranza, Universita di Salerno, C. Savarese, Instituto di Teoria e Tecnica delle Onde Elettromagnetiche*

9:20 Comparison Between Classical and Equivalent Current Approach Near-Field to Far-Field Transformation
S. Blanch, Ll. Jofre, J. Romeu, Universitat Politecnica de Catalunya*

9:40 Probe Positioning Errors in Planar Near Field Measurements. A Plane Wave Synthesis Approach
J. Romeu, P. Escobar, S. Blanch, Universitat Politecnica de Catalunya*

10:00 Study of Automatic Measurement System for High Temperature Superconductor Antenna
X. M. Qing, L. Y. Shen, J. Lu, Q. S. Zhang, Z. X. Luo, Z. X. Tang, University of Electronic Science and Technology of China

Monday AM AP Session 8 Trimaran/Brigantine

Terrestrial and Tropospheric Propagation and Scattering
Eikichi Asari and Sherman Marcus

8:20 Attenuation of Satellite Microwave by A Cumulonimbus
Eikichi Asari, Hokkaido College of Arts and Sciences

8:40 Characteristic Changes in Cross-Polarization Discrimination due to Thunderclouds on Satellite-to-Ground Path
Yasuyuki Maekawa, Nion Sock Chang, Akira Miyazaki, Toshitaka Kojima, Osaka Electro-Communication University*

9:00 The Propagation Effects of Bends in Tropospheric Ducts
Sherman W. Marcus, RAFAEL

9:20 Electromagnetic Wave Radiation Outside the Tunnel
Y. P. Zhang, Y. M. Hwang, The Chinese University of Hong Kong*

9:40 Radar Recognition of Hail Areas
F.J. Yanovsky, Kiev Internatinal Univ. of Civil Aviation, A.B. Shupiatsky, Central Aerological Observatory, I.P. Kapitalchuk, Moldavian Anti-Hail Service*

10:00 BREAK

10:20 Algorithms of Atmosphere Turbulence Detection with Airborne Weather Radar
I.G. Prockopenko, F.J. Yanovsky, Kiev International University*

10:40 The MMW Beam Field Behind Obstacle in Wave Zone
G.A. Andreyev, G.A. Gladyshev, IRE RAS*

11:00 Diagnostics of Plasmapause by Effect of MF Radio Waves Guiding

Monday AM Joint Session 1 Salon B

Wavelets in Electromagnetics I

A. Chan and H. Ling

8:20 Linear Frequency Modulated Signal Detection using Wavelet Packet, Ambiguity Function and Radon Transform
Minsheng Marshall Wang, Andrew K. Chan*, Charles K. Chui, Texas A&M University*

8:40 A Fast Multiresolution Moment Method Algorithm Using Wavelet Concepts
H. Kim, Hanyang University, H. Ling, The University of Texas, Austin*

9:00 Characterization of Microstrip Patch Antennas Based on the Two-Dimensional Wavelet Theory
Kazem F. Sabet, Linda P.B. Katehi, University of Michigan*

9:20 Super-Resolved Parameterization of Dispersive Scattering Mechanisms in the Time-Frequency Plane
L.C. Trintinalia, H. Ling, University of Texas, Austin*

9:40 Time-Frequency Representation of Wideband Radar Echo Using Adaptive Normalized Gaussian Functions
L.C. Trintinalia, H. Ling, University of Texas, Austin*

10:00 BREAK

10:20 Resolution Enhancement and Small Perturbation Analysis using Wavelet Transforms in Scattering Problems
Z. Baharav, Y. Leviatan, Technion - Israel Institute of Tech.*

10:40 On the Use of Wavelet-Like Basis Functions in the Finite Element Solution of Elliptic Problems
Richard K. Gordon, University of Mississippi, Jin-Fa-Lee, Worcester Polytechnic Institute*

11:00 New Wavelet-Like Basis Functions for the 2D Mode Analysis of Coupled Microstrips
K. Blomme, D. DeZutter, H. Devos, University of Ghent*

11:20 A Hybrid Wavelet Expansion and Boundary Element Method in

Electromagnetic Scattering
Gaofeng Wang, Tanner Research, Inc. Jiechang Hou, Wuhan University*

Monday AM Joint/URSI-B Session 2 Salon C

Microstrip Antenna Design and Analysis
L. Shafai and K. Chang

8:20 The Effect of Air-Bridges on the Mode Supression of Asymmetrical CPW-FED Slot Antennas
Chung-Yi Lee, Tatsuo Itoh, University of California at Los Angeles*

8:40 Tolerance Effects on Low-Cost Printed DBS Antennas
Manuel Sierra, Universidad Politecnica de Madrid, George Jankovic, Boulder Microwave Technologies, Inc.

9:00 Alternate Cutoff Radius Criterion for Probe-Fed, Circular Microstrip Patches
D. Chatterjee, R. G. Plumb, University of Kansas

9:20 Design of 24 GHz Microstrip Travelling Wave Antenna for Radar Application
H. Moheb, InfoMagnetics, L. Shafai, University of Manitoba, M. Barakat, InfoMagnetics*

9:40 An Electromagnetically Coupled Microstrip Antenna with a Rotatable Patch
Atsuya Ando, Yasunobu Honma, Kenichi Kagoshima, NTT*

10:00 BREAK

10:20 Ka-Band Aperture Coupled Microstrip Antenna with Image Line Feed
Ming-yi Li, Sridhar Kanamaluru, Kai Chang, Texas A&M University*

10:40 Scattering and Radiation by Conformal Microstrip Antennas with Dielectric Overlay
Leo C. Kempel, Mission Research Corporation, James T. Aberle, Arizona State University*

11:00 Design and Analysis of Slot Array Antennas on a Radial Feed Line
M. Sierra, J. Redoli, Universidad Politecnica de Madrid, M. Vera, A.G. Pino, Universidad de Vigo*

11:20 Slotline Antenna with Non-Leaky Coplanar (NLC) Waveguide Feed
Yaozhong Liu, Chung-Yi Lee, Tatsuo Itoh, University of California, Los Angeles*

11:40 Applications of Planar Multiple-Slot Antennas for Impedance Control, and Analysis Using FDTD with Berenger's PML Method

H.S. Tsai, R.A. York, University of California at Santa Barbara*

Monday AM Joint/URSI-E Session 3 Salon F

Coupling and Shielding
J. L. Drewniak and W. P. Wheless

8:20 Development of Statistical Electromagnetics (STEM) Techniques
W. P. Wheless, University of Alabama, C. B. Wallace, BDM Federal, Inc., W. E. Prather, Phillips Laboratory*

8:40 Analysis of Coupling Through Shielded Apertures
Steven P. Castillo, New Mexico State University, Hector DeAguila, Thomas Loughry, Phillips Laboratory*

9:00 On the Protection Against EM Leakage from ITE
Fang Han, Linchang Zhang, Northern Jiaotong Unviersity*

9:20 Shielding Enclosure Radiation Enhancement Due to Attached Cables
D. M. Hockanson, J. L. Drewniak, T. H. Hubing, T. P. Van Doren, University of Missouri-Rolla*

9:40 High Intensity Radiated Field (HIRF) Penetration in Helicopters
Panayiotis A. Tirkas, Constantine A. Balanis, William V. Andrew, Arizona State University, George C. Barber, NASA Langley Research Center

10:20 Coupling Prediction of HF Antennas Mounted on Helicopter Structures Using the NEC Code
Jian Peng, Constantine A. Balanis, Arizona State University

Monday AM URSI-B Session 1 Catamaran

Guided Waves
T. K. Sarkar and E. W. Lucas

8:20 Plane Wave to Coaxial Waveguide Coupling through an Aperture, using modal expansions in the interior and exterior domains
S. Marteau, B. L. Michielsen, ONERA*

8:40 Analysis of a Coaxial-line Probe Junction to Cylindrical Cavity Filled with a Lossy Dielectric
Richard B. Keam, Adrian D. Green, The New Zealand Institute for Industrial Research and Developement*

9:00 An Analysis Approach for Large Planar Arrays Using a Bound FDTD

Model
Maria Gustavsson, John Sanford, Chalmers University, Magnus Sundberg, Swedish Institute of Food Research*

9:20 Analysis and Design of Orthogonal Mode Couplers in Rectangular Waveguides
Luiz Costa da Silva, Pontificia Universidade Catolica de Rio de Janerio, Emilio Abud Filho, M. G. Castello Branco, CPqD/Telebras

9:40 The Equivalent Circuit for the Junction between Curved and Straight Waveguides
Horacio Tertuliano, Federal University of Ceara, Pierre Jarry, Bordeaux I University

10:00 BREAK

10:20 Wave-Field Patterns on Electrically Large Networks
Ross A. Speciale, Redondo Beach, CA

10:40 Computer-Simulation of Isotropic, Two-Dimensional Guided-Wave Propagation
Ross A. Speciale, Redondo Beach, CA

11:00 A New Edge Element Method for Dispersive Waveguiding Structures
Guangwen Pan, Jilin Tan, University of Wisconsin, Milwaukee*

11:20 OHMIC Loss of Metal-Dielectric Waveguides with Ridges
Alexander Ye. Svezhentsev, Ukranian Academy of Sciences

11:40 Two-Channel Waveguide Modulator Based on the Surface Eigenmode of the Semiconductor-Metal Interface
K. N. Ostrikov, N. A. Azarenkov, O. A. Osmayev, Kharkov State University & Scientific Centre for Physical Technologies*

12:00 High-Q Disk Dielectric Resonators
V. S. Dobromyslov, V. I. Kalinichev, A. V. Krjukov, Moscow Power Engineering Institute*

Monday AM URSI-B Session 2 Salon E

Transients
S. L. Dvorak and P. H. Pathak

8:20 Analytical Treatment of Transient Radiation from Pulse Excited Parabolic Reflectors
H. T. Chou, P. H. Pathak, P. R. Rousseau, Ohio State University*

8:40 Antenna Parameterization in the Time Domain
Amir Shlivinski, Ehud Heyman, Raphael Kastner, Tel-Aviv University*

9:00 Transient Pulse Focusing by a Lens: Analytical and Numerical Analyses
Steven L. Dvorak, Richard W. Ziolkowski, University of Arizona*

9:20 A New Method for the Wideband Protection of Ultra-fast Pulse Generators Against Reflections From Unmatched Antennas
M. Piette, E. Schweicheir, Royal Military Academy Brussels, A. Vander Vorst, Univ. Cath. de Louvain*

9:40 Design of Reflectionless Slabs for Obliquely Incident Transient Plane Waves
Rasmus Hellberg, Royal Institute of Technology

Monday AM URSI-B Session 3 Schooner/Sloop

Antennas I
R. L. Fante and H. Steyskal

8:20 Analysis of a Diversity Antenna Using FDTD Method
Mark Douglas, Michal Okoniewski, Maria A. Stuchly, University of Victoria*

8:40 Mobile SMM Antennas with Pattern-Diversity and Dual-Mode Operations
J. J. H. Wang,J. K. Tillery, Wang-Tripp Corporation*

9:00 Numerical Modeling of an AM / FM Automotive Windshield Slot Antenna
E. Walton, R. Abou-Jaoude, M. Pekar, The Ohio State University*

9:20 Array Pattern Synthesis in the Presence of a Near-Zone Scatterer
Hans Steyskal, Rome Laboratory/ERAA

9:40 Reducing the Off-Boresight Fields of a Broadband TEM Horn
D. J. Wolstenholme, A. J. Terzuoli, G. C. Gerace, Air Force Institute of Technology

10:00 BREAK

10:20 Low Cost Steerable Beam HF Linear Array Antenna of Subarrays for a Prototype Ground Wave Radar
S. A. Saoudy, R. Khan, R. Davis, Memorial University of Newfoundland*

10:40 Circularly Polarised Dielectric Resonator Antenna: Analysis of near and Far Fields using FD-TD Method
Karu P. Esselle, Macquarie University

11:00 Extending a Neural Network Surface Error Compensation Algorithm to Distorted Paraboloidal Reflector Antennas
W. T. Smith, S. Y. Cheah, University of Kentucky*

11:20 Beam Synthesis of Conformal Arrays
John P. Casey, Naval Undersea Warfare Center Detachment, Roy L. Streit, Naval Undersea Warfare Center*

11:40 Adaptive Cancellation of Multiple Mainbeam Jammers
Ronald L. Fante, Richard M. Davis, Thomas P Guella, The MITRE Corporation*

12:00 Superdirectivity in Statistical Antenna Theory
Y. S. Shifrin, V. V. Dolshykov, Kharkov State Technical University of Radio Electronics*

Monday PM AP Session 9 Salon 1/2

Scattering II
P.-S. Kildal and K. A. Michalski

1:20 An FFT T-Matrix Method for Scattering Solutions from Inhomogeneous Bodies and Random discrete Scatterers
W. C. Chew, J. H. Lin, X. G. Yang, University of Illinois, Urbana*

1:40 Bandwidth of Some Artificially Soft Surfaces
Zhinong Ying, Per-Simon Kildal, Chalmers University of Technology, Sweden, Ahmed A. Kishk, University of Mississippi, USA*

2:00 Decomposition of Incident Polarization for the Analysis of Anistropic Surfaces Made of Strips on a Grounded Dielectric Slab
Shuguang Chen, Makoto Ando, Naohisa Goto, Tokyo Institute of Technology*

2:20 Analysis of Electromagnetic Scattering by Periodic Strips on a Grounded Dielectric Slab
Chang Won Lee, Young Ki Cho, Kyungpook National University, Korea*

2:40 Analysis of EM Scattering by Conducting Bodies of Revolution in Layered Media Using the Discrete Complex Image Method
A. K. Abdelmageed, K. A. Michalski, Texas A&M University

3:00 BREAK

3:20 Electromagnetic Scattering by a Conducting Sphere Partially Buried in a Ground Plane
A-K Hamid, King Fahd University of Petroleum and Minerals

3:40 Development of a Blazed Reflection Grating with Enhanced Bandwidth and Angular Range Giving Circularly Polarised Backscattering
Thomaskutty Mathew, Saji Stephen, C. K. Aanandan, P. Mohanan, K. G. Nair, Cochin University of Science and Technology

4:00 The Chirality from Microstructure of Conductive Twist Strips
M. Zhang, Nanjing Aero & Astro University, W-X. Zhang, Southeast University

4:20 Scattering and Mode Conversion by a Penetrable Cylinder in an Asymmetric

Slab Waveguide
Svetlana V. Boriskina, Alexander G. Yarovoy, Kharkov State University, Ukraine*

4:40 Scatterers with Resonant Cavities
V. Veremey, A. Poyedinchuk, Institute for Radiophysics & Electronics, Ukrainian Academy of Sciences, Ukraine*

Monday PM AP Session 10 Salon 3

Adaptive Antennas II
D. Madurasinghe and F. Nan

1:20 SVD Reconstruction Algorithm and Determination of Source Number by Frequency Domain Information
Fangyuan Nan, Florida State University

1:40 An Efficient Joint Direction of Arrival and Frequency ML Estimator
M.A. Zatman, MIT Lincoln Lab, H.J. Strangeways, University of Leeds*

2:00 Real-Time Algorithm for Adaptive Beamforming Using Cyclic Signals
S-J. Yu, J-H. Lee, National Taiwan University*

2:20 Nonlinear Spatial Separation of Multiple Sources In Adaptive Linear Arrays
P. V. Gorev, The Joint Laboratory of NPP "Polyot" & Radiophysical Research Institute

2:40 An Adaptive Antenna Array for Broad-Band Signals Using the Constrained Kalman Filtering
Yuan-Hwang Chen, Ching-Tai Chiang, National Sun Yat-Sen University*

3:00 BREAK

3:20 A New Technique for Phase Only Nulling with Equispaced Arrays
Staffan Lundgren, John Sanford, Chalmers University of Technology*

3:40 Adaptive Nulling Systems for a Narrow-Band Signal with a Look Direction Constraint
Dan Madurasinghe, Defence Science and Technology Organisation

4:00 Modeling and Mitigation of Terrain Scattered Interference
Isamil I Jouny, Lafayette College, Edqin Culpepper, Wright Patterson AFB

4:20 Multi-Target Angle Tracking Via Antenna Array

Yuan-Hwang Chen, Yan-Tzong Lian, Chao-Hung Chen, National Sun Yat-Sen University*

Monday PM AP Session 11 Salon 4

Special Session

Computer-Aided Engineering Education

R. E. Collin and Z. A. Fazerinc

1:20 Quest for Understanding of Natural Sciences
Zvonko Fazarinc, Hewlett-Packard Laboratories

1:40 Visualization of Retardation Effects
H. Haertel, IPN - Institute for Science Education, Kiel, E. Martin, R. Chicon, University of Murcia, Spain

2:00 Visualizing Chaos - Understanding Electrical Signal Concepts
A. M. Close, H. M. Conner, Y. Rzhanov, Heriot-Watt University, Riccarton, Edinburgh*

2:20 The Colos Project: Applications in the Domain of Electrical Engineering
D. Muller, L. Mariaux, A. Nicolas, Ecole Centrale de Lyon, France*

2:40 A C.A.E. Package for an Intuitive Approach to Magnetic Circuits
D. Muller, L. Nicolas, F. Buret, Ecole Centrale de Lyon, France*

3:00 BREAK

3:20 Transmission in Linear Systems. An elementary analysis of a physics phenomenon.
H. Hartel, IPN - Institute for Science Education, Kiel

3:40 Towards a CAT / CAL Software Autoadapting to End-User Learning-Style
L. Mariaux, M. Filippi, H. Cadot, D. Muller, Ecole Centrale de Lyon*

4:00 Transmission Processes in Time Domain
H. Haertel, IPN - Institute for Science Education, Kiel, E. Martin, J. M. Zamarro, University of Murcia, Spain

4:20 CoLoS USA — An Interdisciplinary Consortium for Conceptual Learning

and Innovative Problem Solving
Magdy F. Iskander, J. Corey Catten, Antony Jones, Rex Jameson, Albert Balcells, University of Utah*

Monday PM AP Session 12 Salon 5

Cellular and Terrain-Dominated Propagation
I. Jouny and D. J. Cichon

1:40 Computation-Time Efficient Determination of 3D Propagation Paths in Rural Area
T. C. Becker, D. J. Cichon, W. Wiesbeck, University of Karlsruhe*

2:00 Experimental Investigation of EM Wave Propagation in Urban Microcells Compared to Ray-Launching Simulations at 2 GHz
U. Kauschke, Z. Liu, DeTeMobil GmbH*

2:20 Determination of Time-Variant Radio Links in High-Speed Train Tunnels by Ray Optical Modeling
D. J. Cichon, T. C. Becker, W. Wiesbeck, University of Karlsruhe*

2:40 Microcellular Propagation Modeling Including Antenna Pattern and Polarization
M. Garcia Sanchez, Universidad de Vigo, L. de Haro Ariet, Universidad Politecnica de Madrid, A. Garcia Pino, Universidad de Vigo, M. Calvo Ramon, Universidad Politecnica de Madrid*

Monday PM AP Session 13 Salon 5

Indoor Propagation
C. L. Holloway and C. C. Constantinou

3:20 Spatial Characterisation of Single Room Indoor Propagation at 5.8 GHz
A. Louzir, A. Aemamra, D. Harrison, C. Howson, Thomson Consumer Electronics R&D France*

3:40 Ray Optical Indoor Modeling in Multi-Floored Buildings: Simulations and Measurements
D. J. Cichon, T. Zwick, University of Karlsruhe, J. Lahteenmaki, Technical Research Centre of Finland*

4:00 Analysis of Composite Walls for Short Path Propagation Modeling
Christopher L. Holloway, Kenneth C. Allen Michael G. Laflin, U.S. Department of Commerce*

4:20 On The Wideband Nature of UTD-Based Propagation Models
C. C. Constantinou, M. I. Sheikh, The University of Birmingham*

4:40 Diffraction Modelling and Measurements
Fengzhen Wang, Kerry Cai, John Litva, Keli Wu, McMaster University

Monday PM AP Session 14 Salon B

Horn and Slot Antennas
A. Love and E. El-Sharawy

1:20 Accurate Radiation Characteristics of Horn Antennas - A Moment Method Model
Arun K. Bhattacharyya, Hughes Space and Comm. Co.

1:40 A Corrugated Soft Sector Horn with Different Beam Properties in the Two Principal Planes
J. Salomonsson, Chalmers University of Technology, J. Hirokawa, Tokyo Institute of Technology, P-S. Kildal, Chalmers University of Technology*

2:00 ITD Approach for Predicting Near Field Radiation by a Circular Horn
F. Capolino, S. Maci, F. Mioc, Univ. of Florence, R. Tiberio, Univ. of Siena*

2:20 Radiation from Axisymmetric Waveguide Fed Horns
G. C. Chinn, D. J. Hoppe, L. E. Epp, Jet Propulsion Laboratory*

2:40 The Radiation Characteristics of a Ferrite-Tuned Cavity-Backed Slot Antenna
D.M. Kokotoff, E-B. El-Sharawy, C.R. Birtcher, Arizona State University*

3:00 BREAK

3:20 Radiation by an Axial Slot on a Dielectric-Coated Concentric Conducting Circular Cylinder Loading a Semicircular Gap in a Ground Plane
Hassan A. Ragheb, Umar M. Johar, King Fahd University of Petroleum and Minerals*

3:40 Planar Shunt Slot Array with L-Shaped Series / Series Coupling Slot
Pyong K. Park, Hughes Missile Systems

4:00 Wideband Ridge Waveguide Radiating Element for Phased Array Antennas
A. K. Agrawal, M. S. Perry, N. R. Landry, Martin Marietta Corporation*

Monday PM AP Session 15 Salon C

Microstrip Antenna Arrays
T. A. Metzler and J. Huang

1:20 Stub Loaded Microstrip Reflectarrays
T. A. Metzler, Ball Telecommunication Products Division

1:40 Analysis and Design of Millimeter Wave Microstrip Reflectarrays
S. D. Targonski, D. M. Pozar, University of Massachusetts, H. D. Syrigos, Alpha Industries, Inc.*

2:00 Bandwidth Study of Microstrip Reflectarray and a Novel Phased Reflectarray Concept
John Huang, Jet Propulsion Laboratory

2:20 A Microstrip Array Fed by a Non-Homogeneous Stripline Feeding Network
Naftali I. Herscovici, Spears, Associates, Inc. Nirod K. Das, Weber Research Institute, Josh Klugman, Polyflon Company*

2:40 A Numerical Model for Multilayered Microstrip Phased Array Antennas
Arun K. Bhattacharyya, Hughes Space and Communications

3:00 BREAK

3:20 Design of a Multi-Layer Transmit/Receive Dual-Frequency Microstrip Patch Antenna Array
Greg Lee, Hewlett Packard Laboratories, Masoud Mostafavi, San Jose State University

3:40 A Dual-Band Stacked Microstrip Antenna Array for Mobile Satellite Applications
Siva Chebolu, Supriyo Dey, Raj Mittra, University of Illinois, Mike Itoh, Matsushita Electric Works, Ltd.*

4:00 Scan Comparison of Several Techniques for Generating Circular Polarization in Probe-Fed Microstrip Patch Phased Arrays
R. B. Waterhouse, Royal Melbourne Institute of Technology

4:20 Reciprocity Analysis of an Infinite Array of Offset Dual-Patch Antennas
T.M. Au, K.F. Tong, K.M. Luk, City University of Hong Kong*

4:40 Printed Antenna Arrays: A Perturbation Analysis
A. K. Skivervik, J. R. Mosig, Ecole Polytechnique Federale de Lausanne*

Monday PM AP Session 16 Salon D

Time Domain Numerical Methods (FDTD) II
R. Luebbers and K. Lee

1:20 IBC Simulaton in the FDTD/FVTD Hybrid for Smooth Surfaces
Kane. S. Yee, Jei S. Chen, Lockheed Palo Alto Research Laboratory

1:40 Artificial Tapered Damping Near the Outer Computation Boundary in

FDTD and FDTD/FVTD Hybrid
Jei S. Chen, Kane S. Yee, Lockheed Palo Alto Research Laboratory

2:00 Numerical Experiments on PEC Boundary Condition and Late Time Growth Involving the FDTD/FDTD and FDTD/FVTD Hybrid
Kane S. Yee, Jei S. Chen, Albert H. Chang, Lockheed Palo Alto Research Laboratory

2:20 A Frequency Dependent FDTD Surface Impedance for Scattering from Coated PEC Targets
C. W. Penney, R. J. Luebbers, J. W. Schuster, The Pennsylvania State University

2:40 An Efficient Higher Order Numerical Convolution for Modelling Nth-Order Lorentz Dispersion
Riaz Siushansian, Joe LoVetri, The University of Western Ontario*

3:00 BREAK

3:20 Extremely Low Frequency Numerical Modeling in Lossy Media Using the FDTD
Wai L. Ko, Raj Mittra, University of Illinois

3:40 FDTD Analysis of Apache Helicopter HF Antennas
William V. Andrew, Constantine A. Balanis, Arizona State University

4:00 A Comparison of FD-TD and the Method of Moments to Model Electrically Small Antennas
A. D. Monk, M. Rayner, A. D. Olver, University of London, UK*

4:20 FDTD Analysis of a Strip Dipole for a Circularly Polarized Printed Array Fed by Stripline
S-i. Matsuzawa, M. Naito, J. Ogawa, K. Ito, Chiba University*

4:40 Electromagnetic Wave Propagation in Waveguides with Magnetized Plasma
Marcelo Eduardo Vieria Segatto, Federal University of Espirito Santo, Rubem Goncalves Farias, Federal University of Para, Attilio Jose Giarola, State University of Campinas

5:00 On the Invariance of the MEI to the Field of Excitation
K. M. Luk, Edward K. N. Yung, K. W. Leung, City University of Hong Kong

Monday PM AP Session 17 Salon E

Space Antennas
B. A. Bourgeois and E. Lier

1:20 Space Station GPS Antennas Multipath Analysis
S.U. Hwu, B.P. Lu, Lockheed, R.J. Panneton, B.A. Bourgeois, NASA/LBJ*

1:40 X-band SAR Active Antenna Design for Small Satellite Applications
G. Codispoti, M. Lisi, V. Santachiara, Alenia Spazio S.p.A

2:00 Sidelobe Reduction with Array Fed Spherical Lenses
John Sanford, Zvonomir Sipus, Chalmers University*

2:20 EHF Multiple Beam Dielectric Lens Antenna
Q.M. Tang, Spar Aerospace Ltd., K.K. Chan, Chan Tech, Inc., G.A. Morin, Defence Research Estb., S.K. Rao, Spar Aerospace Ltd.*

2:40 Impact of Optical Baffle on Antenna Pattern
T. K. Wu, Jet Propulsion Laboratory*

Monday PM AP Session 18 Salon E

Circular and Ring Microstrip Antennas
N. G. Alexopoulos and T. Fujimoto

3:20 Electromagnetically Coupled Microstrip Ring-type Antennas of Arbitrary Shape
Ming-Ju Tsai, Nicolaos G. Alexopoulos, UCLA*

3:40 Radiation Properties of Ring-Microstrip Antenna With Slit as Polarization Controller
E.T. Rahardjo, S. Tsuda, A. Matsui, M. Haneishi, Saitama University*

4:00 Bandwidth Widening in an Annular Ring Microstrip Antenna with Superstrate
Cigdem. S. Gurel, Erdem Yazgan, Hacettepe University*

4:20 Surface Admittance of Circular Microstrip Antenna
T. Fujimoto, M. Taguchi, K. Tanaka, Nagasaki University*

4:40 A Broadband Low Profile Microstrip Circular Patch Antenna
Jacob George, P. Mohanan, K. G. Nair, Cochin University of Science and Technology*

Monday PM AP Session 19 Trimaran/Brigantine

MM Waves and Dieletric Resonator Antennas
K. Webb and G. Rebeiz

1:20 Investigation of Hybrid Modes in Broadside-Coupled Coplanar Waveguide for MW & MMW Integrated Circuits
Cam Nguyen, Texas A&M University*

1:40 A Double Folded-Slot Antenna at 94 GHz
Sanjay Raman, Thomas M. Weller, Linda Katehi, Gabriel Rebeiz, University of Michigan*

2:00 Vlasov Feeds with Corrugated Flares for Pattern Enhancement
Phil J. Sealy, R. J. Vernon, University of Wisconsin, J. A. Lorbeck, Qualcomm, Inc.*

2:20 Application of the Scattering Optimization Method for the Design of Circular Waveguide Mode Converters
Tanveer Ul Haq, Kevin J. Webb, Purdue University, Neal C. Gallagher, University of Delaware*

2:40 94 GHz slot-Ring Antennas for Monopulse Applications
Sanjay Raman, Gabriel Rebeiz, University of Michigan*

3:00 BREAK

3:20 Analysis of Symmetrical and Asymmetrical Fin-line Structures Using the Integral Equation Technique
A. Boubertakh, M. Drissi, J. Citerne, INSA/LCST, CNRS, France

3:40 Hemispherical Dielectric Resonator Antenna with a Concentric Conductor
K. M. Luk, K. W. Leung, Edward K. N. Yung, City University of Hong Kong*

4:00 Magnetic Quadrupole Mode Dielectric Resonator Antenna
R. K. Mongia, A. Ittipiboon, M. Cuhaci, Communications Research Centre*

4:20 A New Broadband Circularly Polarized Dielectric Resonator Antenna
M.B. Oliver, Y.M.M. Antar, Royal Military College of Canada, R.K. Mongia, Communications Research Centre*

4:40 Resonant Second Harmonics Generation of the Submillimeter Surface Wave in the Semiconductor Superlattice Bounded by a Metal
K.N. Ostrikov, N.A. Azarenkov, I.B. Denisenko, Kharkov State University*

Monday PM AP Session 20 Yawl

Random Media and Microstrip Components
Y. Kuga and S. A. Long

1:20 A Technique for Measuring the Effective Propagation Constant of Dense Random Media
Adib Nashashibi, Kamal Sarabandi, University of Michigan*

1:40 Monte Carlo Simulations of Backscattering Enhancement of Electromagnetic Waves from Two-Dimensional Perfectly Conducting Random Rough Surfaces and Comparison with Experimental Data

K. Pak, University of Washington, J. Johnson, MIT, L. Tsang, C. Chan, Y. Kuga, University of Washington*

2:00 Strong Fluctuation Theory for a Mean EM Field in a Statistically Inhomogeneous Medium: Case of Cylindrically-Layered Medium
Nickolay P. Zhuck, Klaus Schunemann, Technische Universitat Hamburg-Harburg*

2:20 A Circularly Polarized HTS Microstrip Antenna Array
Jarrett D Morrow, Jeffery T. Williams, Matthew F. Davis, Darian L. Licon, Stuart A. Long, John C. Wolfe, University of Houston*

2:40 HTSC Microstrip Transmission Line and its Discontinuities
Tiejun Yu, Xuexia Zhang, Peiheng Wu, Tsinghua University*

Monday PM AP Session 21 Yawl

TLM and Method of Lines
W. Hoeffer and R. K. Mongia

3:20 TDTLM Analysis of a Resonant Structure Using Modal Theory
Zhizhzhang Chen, Technical University of Nova Scotia

3:40 Modeling of Inhomogeneous Dielectric Layers Using TLM Cuboid Condensed Node
Qi Zhang, W. Hoefer, University of Victoria*

4:00 Dispersion Analysis of State-Variable TLM Symmetrical Condensed Node
L. de Menezes, W. Hoefer, University of Victoria*

4:20 TLM Analysis of Rectangular Dielectric Resonator Antennas
A. Dhouib, M. G. Stubbs, R. K. Mongia, Communication Research Centre, M. Lecours, Laval University*

4:40 Analysis of Open Planar Structures Using the Method of Lines with Periodic Boundary Conditions
H.Q. Zhu, Y. Long, D.G. Fang, Nanjing University of Science and Technology*

Monday PM Joint/URSI-B Session 4 Schooner/Sloop

Special Session

Higher Order Modeling in Computational Electromagnetics
D. R. Wilton, A. F. Peterson and R. D. Graglia

1:20 Some Results on H(curl) Finite Elements
Jean-Claude Nedelec, CMAP Ecole Polytechnique

1:40 Edge Elements, Nodal Elements and the Finite-element Modeling of Electromagnetic Fields
Gerrit Mur, Delft University of Technology

2:00 Why Complete Continuity Constraints in Vector Basis Functions are Undesirable
A. F. Peterson, Georgia Institute of Technology, Donald R. Wilton, University of Houston*

2:20 High-Order Finite Element Methods in Electromagnetic Field Computation
Zoltan Cendes, Carnegie Mellon University

2:40 Application of Higher Order Vector Elements to the Coupled Finite Element-Combined Field Integral Equation (FE / CFIE) Technique
Vahraz Jamnejad, Tom Cwik, Cinzia Zuffada, Jet Propulsion Laboratory*

3:00 BREAK

3:20 Higher Order Edge Finite Elements in Electromagnetic Field Modelling
I. Bardi, O. Biro, R. Dyczij-Edlinger, K. Preis and K. R. Richter, IGTE, Technical University of Graz*

3:40 Higher Order Divergence-Conforming and Curl-Conforming Bases on Curved Elements
R. D. Graglia, Politecnico di Torino, A. F. Peterson, Georgia Institute of Technology, D. R. Wilton, University of Houston*

4:00 Higher-Order Discretization of Integral Equations with Singular Kernels
Stephen Wandzura, Hughes Research Lab.

4:20 Local Interpolatory Cardinal Spline (LICS) Method in Solving Linear and Nonlinear Schrodinger Equation
J. J. Chen, National Yunlin Polytechnic Institute, J. Zha, Valmet Automation Inc. M. Du, J. C. Goswami, A. K. Chan, C. K. Chui, Texas A&M University

Monday PM URSI-B Session 4 Catamaran

Chiral Media
D. L. Jaggard and I. V. Lindell

1:20 Some Possible Effective-Medium Descriptions for Bi-anisotropic Inclusions with Non-random Orientation
Ari Sihvola, Juha Juntunen, Helsinki University of Technology

1:40 Source Decomposition Theory for Uniaxial Media

I. V. Lindell, Helsinki University of Technology

2:00 Analysis of Wave Propagation in a Chiral-Filled Rectangular Waveguide
Abhay R. Samant, University of Illinois, Keith W. Whites, University of Kentucky*

2:20 Scattering From a Chiral-Coated Conducting Cylinder of Arbitrary Cross Section
M. Al-Kanhal, E. Arvas, Syracuse University*

2:40 Measured and Computed EM Scattering Comparison for Chiral-Material Slabs
Keith W. Whites, University of Kentucky

3:00 BREAK

3:20 Reflection and Transmission Characteristics of Chiral Panels
D. E. Jussaume, Rockwell International, S. Singh, The University of Tulsa*

3:40 TE - TM Decoupling in Rectangular Coordinates for Guided Propagation in Bianisotropic Media
P. L. E. Uslenghi, University of Illinois at Chicago

4:00 On The Brillouin Diagrams for Periodic Chiral Media
D. L. Jaggard, K. M. Flood, University of Pennsylvania

4:20 Electromagnetic Fields in Open Chirostrip Structures Excited by Printed Dipoles
J. C. da S. Lacava, Instituto Tecnologico de Aeronautica, Feliciano Lumini, EMBRAER

4:40 Chiral Absorbers: Effects of Chirality or of Inclusion Shape?
S. A. Tretyakov, A. A. Sochava, St. Petersburg State Technical University, C. R. Simovski, St. Petersburg Institute of Fine Mechanics and Optics

5:00 Electromagnetic Scattering By Bi-Uniaxial Stratified Media
S. Shulga, O. Charkina, Kharkov State University*

Monday PM URSI-A Session 5 Salon A

Antennas and EM Field Metrology
B. Cown and Z. Hussein

1:20 Microwave Imaging and Holographic Diagnostic to Antennas in Cylindrical Near-Field Measurement
Ziad A. Hussein, Jet Propulsion Laboratory

1:40 Hybrid Near-Field Measurement / Analysis Technique for Predicting Installed Antenna Performance and Coupling

B. J. Cown, Satimo, Inc., J. Ch. Bolomey, D. Picard, SUPELEC, J. P. Estrada, Georgia Tech.

2:00 A New Method for Phase Antenna Pattern Reconstruction from Amplitude Measurements Only
Pavel Yu. Kostenko, Alexandr A. Adamenko, Yuri V. Bulka, Kharkov Aviation Institute*

2:20 EMF Near Passive Secondary Radiators
Hubert Trzaska, Technical University of Wroclaw

2:40 A Method to Evaluate the Effectiveness Outside a Building of Electromagnetic Noise Countermeasures
Yuji Maeda, Yoshiyuki Komatsu, Kazuo Murakawa, Hiroshi Yamane, NTT Telecommunication Networks Laboratories*

3:00 BREAK

3:20 On Modeling the Quantum Microscale Electromagnetic Probe
Leon A. Steinert, Physical Synergetics Institute

3:40 Operative Testing of Antenna-Surface Thermic Distortions
V. Khaikin, The Special Astrophysical Observatory

4:00 A Study of Reflecting Surface of Single RATAN-600 Panels
V. Khaikin, The Special Astrophysical Observatory

Monday PM URSI-B Session 6 Salon F

Antennas II

S. R. Rengarajan and S. S. Stuchly

1:20 The Dielectric Wedge Antenna Fed by a Slab Waveguide Using Local Mode Theory and Equivalent Current Distributions: TE-Case
Felix Schwering, U. S. Army CECOM, Gerald M. Whitman, Wan-Yu Chen, New Jersey Institute of Technology*

1:40 Modeling Antenna Performance with an Efficient Hybrid Finite Element - Integral Equation - Waveguide Mode Matching Technique
Cinzia Zuffada, Tom Cwik, Vahraz Jamnejad, Jet Propulsion Laboratory*

2:00 Mutual Coupling Between Waveguide-Fed Transverse Slots Radiating Between Baffles
Sembiam R. Rengarajan, California State University, Northridge

2:20 Millimeter-Wave Dielectric Resonator Antenna Array
M. G. Keller, M. B. Oliver, Y. M. M. Antar, Royal Military College of Canada, D. Roscoe, R. K. Mongia, A. Ittipiboon, Communications Research Centre*

2:40 Analysis of Equiangular Spiral Antennas
Stuart M. Wentworth, Sadasiva M. Rao, Auburn University*

3:00 BREAK

3:20 Equivalent Circuit of Long Dipole Antenna
M. Hamid, University of South Alabama

3:40 Impedance Bandwidth of Bent Wire Antennas
M. Ali, S. S. Stuchly, K Caputa, University of Victoria*

4:00 Active Antenna Phase Control using Subharmonic Locking
P. S. Hall, A. Zarroug, M. Cryan, The University of Birmingham

4:20 Below-Resonant Length Slot Radiators For Travelling Wave Array Antennas
Klaus Solbach, Daimier-Benz Aerospace

4:40 Study of VLF Antennas Immersed into Seawater: Moment Method Computations and Development of an Equivalent Physical Model
ahia Benhabiles, Michel Pellet, DCN/CTSN/TIRN, Albert Papiernik, Christian Pichot, Universite de Nice-Sophia Antipolis, Philippe Lacour, TEUCHOS PACA*

5:00 Fast Data Weighting Algorithms for Equidistant Array Digital Signal Processing
I. P. Anukhin, V. V. Lukin, Kharkov Aviation Institute*

Tuesday AM AP Session 22 Catamaran

Electromagnetic Theory I
P.-S. Kildal and Y. L. Chow

8:20 A Rigorous Analysis of the Generalized Rayleigh-Gans Approximation
James M. Stiles, Kamal Sarabandi, University of Michigan

8:40 On Solving the Scattering of a Plane Wave by a System of Two Thin Spheroids Closely Packed by Using the Quasi-addition Theorem
T. Do-Nhat, R.H. MacPhie, University of Waterloo*

9:00 On the Existence of the Near Zone Inverse Doppler Effect
Yehuda Ben-Shimol, Dan Censor, Ben-Gurion University*

9:20 Two-DImensional ANalysis of Bandwidth of Open Hard Surface
Zvonimir Sipus, University of Zagreb, Per-Simon Kildal, Johan Salomonsson, Chalmers University of Technology*

9:40 Simulated Images for Multilayer Media, Complex Images without Prony's Method
Y. L. Chow, A. Torabian-Esfahani, N. Hojjat, University of Waterloo

10:00 BREAK

10:20 A Simple 'Derivation' of Maxwell's Equations Relying on the new Extended Helmholtz Theorem
Robert D. Nevels, Texas A&M University

10:40 Dyadic Green's Functions in the Prolate Spheroidal Coordinate System
Attilio Jose Giarola, State University of Campinas

11:00 EM Wave Excitation and Propagation in a Generally Anisotropic Homogeneous Medium: A Coordinate-Free Approach
Nickolay P. Zhuck, Abbas S. Omar, Technische Universitat Hamburg-Harburg*

11:20 Dispersion of Magnetohydrodynamic Waves on the Discontinuities
A. A. Aleksandrova, N. A. Khiznjak, Test-Radio LTD

11:40 The Impedance Vibrator in an Anisotropic Plasma
N. A. Khizhniak, E. A. Yatsenko, N. M. Yatsenko, Kharkov State University, Ukraine*

Tuesday AM AP Session 23 Salon 1/2

Time Domain Methods (Various)
C. H. Chan and B. J. Kooij

8:20 FD-TLM Modeling of Picosecond Electromagnetic Signal Propagation in High-Frequency Mosfet Circuits
Robert H. Voelker, Kendall B. Eggers, Christopher G. Sentelle, University of Nebraska-Lincoln*

8:40 A Novel Development in the Analysis of Electromagnetic Scattering from Complex Structures
E. J. Ridgway Watt, A. J. Page, D. Woods, British Aerospace, K. Morgan, O. Hassan, University College, Swansea*

9:00 An Efficient Initialization Method for FDTD Computation of Plane Wave Scattering
M. Jaureguy, P. Borderies, CERT/ONERA*

9:20 A Single-Matrix Whitney Element Time-Domain Method for Two-Dimensional Problems
H. Sangani, C.H. Chan, University of Washington*

9:40 TD-UTD Slope Diffraction for a Perfectly Conducting Curved Wedge
P.R. Rousseau, P.H. Pathak, The Ohio State University*

10:00 BREAK

10:20 Transient Electromagnetic Field Emitted by a Pulsed Current Travelling Along Finite, Thin Straight Wires Above a Plane Non-Perfectly Conducting Earth
B.J. Kooij, Delft University of Technology

10:40 A Time Domain Analysis of Slot Antennas
R. Moini, G. Z. Rafi, A. Tavakoli, Amirkabir University of Technology, Iran*

11:00 Pulse Characteristic of SMooth Objects in Bystatic Case
Oleg I. Sukharevskij, Vitaly A. Vasilets, Stanislav A. Gorelyshev, Academy of Science of Applied Radioelectronics, Ukraine

Tuesday AM AP Session 24 Salon 5

Reflector Antennas I
A. Roederer and S. Ghosh

8:20 Characterisation of Near-Field Focusing with Application to the Arecibo Tri-reflector System
Per-Simon Kildal, Chalmers University of Technology, Michael M. Davis, National Astromony and Ionosphere Center*

8:40 Elliptical Beam Closed-Form Dual-Reflector Antenna Efficiently Illuminated by a Feed with an Axially-Symmetric Radiation Pattern
Kenneth W. Brown, Hughes Aircraft Company, Aluizio Prata, Jr., University of Southern California*

9:00 Noise Reduction Shield on a Double-Offset Reflector Antenna and its Effect on Antenna Sidelobe Structure
S. Srikanth, National Radio Astronomy Observatory

9:20 Interpolation of Reflector Surfaces Using Deformed Plate Theory
Alan R. Keith, Hughes Aircraft Company, Aluizio Prata, Jr., University of Southern California*

9:40 Equivalence of Physical Optics and Aperture Field Integration Method in the Full Pattern Analysis -Effects of Integration Surface-
M. Oodo, M. Ando, Tokyo Institute of Technology*

10:00 BREAK

10:20 High Performance Reflector Hat Antenna With Very Low Sidelobes for Radio-Link Applications
J. Hansen, Chalmers University of Technology, A.A. Kishk, University of Mississippi, P-S. Kildal, O. Dahlsjo, Ericsson Radar Electronics*

10:40 Spherical Wave Strut Blockage in High Gain Reflector Antennas
S. Maci, Univ. of Florence, R. Mizzoni, Alenia Spazio, B. Romani, Univ. of Florence, R. Tiberio, A. Toccafondi, Univ. of Siena*

11:00 Milstar Reflector Antennas With Electronic Tracking Feeds
J.F. Pedersen, G.A. Schay, G.S. Avallone, P.W. Hannan, Hazeltine Co.*

11:20 A Prospective Theoretical Study of Double Offset with Spherial Main Reflector Application to Ku Band Ground Stations
Luis Claudio Palma Pereira, CPqD/Telebras

11:40 Radiation Analysis of Reflector Antennas by Gaussian Beam Method
Y. Z. Ruan, H. J. Shou, J. Lin, University of Electronic Science and Technology of China*

12:00 Modelling a Resistive-Reflector Antenna by the Complex Source-Dual Series Approach: The 2-D Case of H-Polarization
A. Altintas, Bilkent University, Ankara, Turkey, A. I. Nosich, Inst. Radiophysics and Electronics, V. B. Yurchenko, Kharkov State Polytechnical University, Ukraine*

Tuesday AM AP Session 25 Salon B

Antenna Arrays I
R. Telikepalli and H. M. Aumann

8:20 Phased Array Calibrations Using Measured Element Patterns
H. M. Aumann, F. G. Willwerth, MIT Lincoln Laboratory*

8:40 Analysis of Small Arrays Above Ground Planes of Finite Extent
A. J. Parfitt, The University of Adelaide*

9:00 Using a Small Array to Optimize Dipole Match in the Presence of Mutual Coupling
Leendert J. du Toit, Reutech Radar Systems

9:20 A Comparison between Stacked Slotted and Solid Square Patches in Phased Array Environment for Wide Angle Coverage
Radha Telikepalli, CAL Corporation

9:40 Array Element Pattern Shaping by a Parasitic Element
Y. Kuwahara, Y. Kadowaki, K. Matsumoto, NEC Corporation

10:00 BREAK

10:20 Synthesis of Multiple Beam Linear Antenna Arrays Using Genetic Algorithms
D. Marcano, F. Duran, O. Chang, Universidad Simon Bolivar*

10:40 On Null Steering in Rectangular Planar Array using External Elements
S. H. Zainud-Deen, Riyadh College of Telecommunications

11:00 A Circuit Model for Antenna Array Mutual Coupling Effects
K-C. Lee, T-H. Chu, National Taiwan University*

11:20 Frequency Scanning Printed Array Antenna
Aleksandar Nesic, Sasa Dragas, Institute of Microwave Techniques and Electronics*

Tuesday AM AP Session 26 Salon C

Microstrip Patch Antenna Analysis

Y. Chen and C. S. Lee

8:20 Dispersion Characteristics of Shielded Coupled Microstrip Lines on Ferrimagnetic Substrate
Kunquan Sun, Jackson State University, Yinchao Chen, University of Illinois at Urbana Champaign

8:40 Asymptotic Method for Evaluating Matrix Elements in Microstrip Antenna Analysis
Choon Sae Lee, Tung-Hung Hsieh, Southern Methodist University, Vahakn Nalbandian, US Army CECOM*

9:00 Full Wave Analysis of Microstrip Patch Antenna by a Modified Least-Squares Boundary Residuals Method
M. Ghomi, S. Pujol, H. Baudrand,ENSEEIHT*

9:20 Rigorous Analysis of Rectangular Microstrip Antennas with Parasitic Patches
Shyh-Yeong Ke, Kin-Lu Wong, National Sun Yat-Sen University

9:40 Generalized Spectral Domain Analysis of an Infinite Array of Dielectric Supported Metal Strip Antennas
K.N. Yeo, A.J. Parfitt, University of Adelaide*

Tuesday AM AP Session 27 Salon D

Microstrip Patch Antennas II

R. H. Johnston and K. Tsukamoto

8:20 A Compact Two Way Diversity Microstrip Upatch Antenna
M. G. Douglas, University of Victoria, R. H. Johnston, University of Calgary/TR Labs.*

8:40 A Compact Microstrip Antenna for CP

S. Dey, S. Chebolu, R. Mittra, University of Illinois, Ikmo Park, Goldstar CRL, T. Kobayashi, M. Itoh, Matsushita Electric Works*

9:00 Dual Polarized Flat Array Antenna
K. Tsukamoto, T. Saitou, Matsushita Electric Works Ltd., H. Arai, Yokohama National University

9:20 Dual-Polarized Slot Antennas with Stacked and Coplanar Feed Systems
K. Nakayama, H. Nakano, Hosei University

9:40 Analysis of Cross-Shaped Dual-Polarized Microstrip Patch Antennas
Ahad Tavakoli, Nader Damavandi, Rouzbeh Moini Mazandarani, Amirkabir University of Technology*

10:00 BREAK

10:20 Omnidirectional Circularly-Polarized Conformal Microstrip Array for Telemetry Applications
Doris I. Wu, Boulder Microwave Technologies

10:40 Conformal Low-Profile Multifunction Antennas
J.J.H. Wang, V.K. Tripp, J.K. Tillery, Wang-Tripp Corporation*

11:00 Wide Band Confocal Annular Elliptic Microstrip Antenna
Fayez A. Alhargan, KACST, Sunil R. Judah, Hull University*

11:20 Radiation Characteristics of Helical Microstrip Antennas
Abdelfattah A. Elsohly, Egyptian Armed Forces, Atef Z. Elsherbeni, University of Mississippi, Atef Ghoneim, Military Technical College, Cairo*

11:40 A Novel Broadband Microstrip Antenna
Zhu Bocheng, Institute of Command and Technology, Beijing, Liu Zhangfa, Li Shizhi, Beijing Institute of Technology

Tuesday AM AP Session 28 Salon E

Computational Issues and Large Systems
E. K. Miller and N. K. Uzunoglu

8:20 A Computational Study of the Effect of Matrix Size and Type, Condition Number, Coefficient Accuracy and Computation Precision on Matrix-Solution Accuracy
E.K. Miller, Ohio University

8:40 Scalability of Parallel Processing Method of Moments Technique in Treating Electrically Large Electromagnetic Structures
D.I. Kaklamani, A. Marsh, N.K. Uzunoglu, Univesity of Athens*

9:00 Electromagnetic Calculations for Large Bodies of Translations
G. Davis, Lockheed

9:20 Detection of the Interior Resonance Errors of Surface Integral Boundary Conditions for Scattering Problems
Yinshang Liu, Kevin J. Webb, Purdue University*

9:40 Stabilizing the Time-Marching EFIE Algorithm
S. Kashyap, Defence Research Establishment Ottawa, M. Burton, InfoMagnetics Tech. Corp., A Louie, S. & S. Software*

10:00 BREAK

10:20 Comparative Study of Acceleration Techniques for Integrals and Series in Electromagnetic Problems
N. Kinayman, M.I. Aksun, Bilkent University*

10:40 Analysis of Narrow Wall Slots in a Rectangular Waveguide Excited by Tilted Wires using the Virtual Cylinder Method
Jiro Hirokawa, Tokyo Institute of Technology, Per-Simon Kildal, Chalmers University of Technology*

11:00 Rectangular Waveguide Green's Funtion Involving Complex Images
D.G. Fang, F. Ling, Y. Long, Nanjing University of Science and Technology*

Tuesday AM Joint/URSI-B Session 5 Salon C

Microstrip Antenna Analysis Methods
R. G. Rojas and D. De Zutter

10:20 Analysis and Treatment of Edge Effects on the Radiation Pattern of a Microstrip Patch Antenna
Michael F. Otero, Roberto G. Rojas, The Ohio State University*

10:40 Extension of the Compression Approach to Include Device Metalizations in Electromagnetic Simulations
S. Ooms, D. De Zutter, University of Gent*

11:00 On The Space Domain Green's Function for Microstrip Geometries
S. Marchetti, J. M. Laheurte, Universite Nice-Sophia Antipolis*

11:20 A Full-Wave Analysis of Active Uniplanar Structures
E. Vourch, M. Drissi, J. Citerne, INSA/LCST*

11:40 A Moment-Method Analysis Technique for Microstrip Antennas
S. Adeniyi Adekola, A. Ike Mowete, University of Lagos*

Special Session

Scattering by Wedges I

E. Marx and P. L. E. Uslenghi

8:20 Electromagnetic Scattering by Wedges
Egon Marx, National Institute of Standards and Technology

8:40 A Formulation of Self-Similar Dielectric Wedge Diffraction
G. L. Wojcik, Weidlinger Associates

9:00 Scattering by a Dielectric Wedge: Oblique Incidence
Egon Marx, National Institute of Standards and Technology

9:20 Scattering by a Composite Wedge of Metal and Dielectric
Huen-Tae Ha, Jung-Woong Ra, Korea Advanced Insitiute of Science and Technology*

9:40 Geometrical Optics Exact and Approximate Solutions for Metal-Dielectric Wedge Structures
P. L. E. Uslenghi, University of Illinois at Chicago, N. J. Damaskos, Damaskos, Inc.*

10:00 BREAK

10:20 Diffraction by a Second Order Impedance Wedge
Thomas B. A. Senior, The University of Michigan

10:40 Oblique-Incidence Scattering from Impedance and Coated Wedges by the Method of Virtual Rays
N. G. Alexopoulos, University of California at Los Angeles, D. R. Jackson, University of Houston, P. Ya. Ufimtsev, J. A. Castaneda, Phraxos Research and Development, Inc.*

11:00 Diffraction at an Edge of a Truncated, Grounded Dielectric Slab
L. Borselli, S. Maci, L. Rossi, University of Siena, R. Tiberio, University of Florence

11:20 Scattering of a Plane Wave by a Dielectric Wedge
D. Bogy, University of California, Berkeley, B. Budaev, Steklov Mathematical Institute

11:40 Eigenfunctions of Wedge-Shaped Regions
Bair Budaev, Steklov Mathematical Institute

12:00 Towards Applied Adaptation of the Malyuzhinets' Solution
A. V. Osipov, St. Petersburg State University

Finite Element Methods

T. Cwik and T. P. Fontana

8:20 A Functional That Eliminates Spurious Solutions and the Finite Element Implementation
C. F. Bunting, Old Dominion University, W. A. Davis, Virginia Polytechnic Institute and State University*

8:40 Investigation of Numerical Dispersion in the Finite-Element Method Using Three-Dimensional Edge Elements
Gregory S. Warren, USAF Rome Laboratory, Waymond R. Scott, Jr. Georgia Institute of Technology*

9:00 Finite Element Analysis of Conformal Antennas on Doubly Curved Platforms
Tayfun Ozdemir, John L. Volakis, University of Michigan*

9:20 The Treatment of Edge Singularities in Waveguiding Problems Using a Finite Element Method Based on Edge Elements
Z. Pantic-Tanner, San Francisco State University, D. R. Tanner, Lockheed Martin, J. S. Savage, A. F. Peterson, Georgia Institute of Technology*

9:40 Finite Element Analysis of Cavity Backed Apertures in Three Dimensional Bodies
C. J. Reddy, M. D. Deshpande, C. R. Cockrell, F. B. Beck, NASA-Langley Research Center*

10:00 BREAK

10:20 Implementing Voltage and Current Gap Sources in Finite Elements
Xingchao Yuan, Zoltan Cendes, Ansoft Corporation*

10:40 A 3-D Vector Finite Element Analysis for Modeling Lossy Anisotropic Ferrite Devices
Thomas P. Fontana, Eric W. Lucas, Westinghouse Electric Corporation*

11:00 Edge-based Vector Finite Element Method and its Application to Aperture Coupling Between Rectangular Waveguides
J. Zhou, J. J. Song, Y. Kang, R. L. Kustom, Argonne National Laboratory, T. T. Wong, Illinois Institute of Technology*

11:20 An Infinite Element for the Finite Element Quasi-Static Analysis of Open Waveguiding Structures
Magdalena Salazar-Palma, Universidad Politecnica, Jose-Felix Hernandez-Gil,*

Telefonica Investigacion y Desarrollo

11:40 First and Second Order Curved Non-Standard Finite Elements for the Dynamic Analysis of Waveguiding Structures with Curved Contours
Fernando Blanc-Castillo, Magdalena Salazar-Palma, Luis E. Garcia-CAstillo, E.T.S.I. Telecomunicacion*

12:00 A Second Order Non-Standard Finite Element for the Dynamic Analysis of Generalized Waveguiding Structures
Fernando Blanc-Castillo, Magdalena Salazar-Palma, Luis E. Garcia-Castillo, E.T.S.I. Telecomunicacion. Universidad Politecnica*

Tuesday AM URSI Session 8 Salon 4

Special Session

Tribute to Professor Irene Peden
A. Ishimaru

8:20 Irene Peden: Her Professional and Human Impact
Akira Ishimaru, University of Washington

8:40 Reminiscences of Research in Antarctica: A Tribute to Professor Irene Peden
George E. Webber, HFS Inc.

9:00 Dr. Irene Peden and the NSF
Lawrence S. Goldberg, National Science Foundation

9:20 Engineering Education in the Nineties: Challenges and Opportunities
David C. Chang, Polytechnic University

9:40 Irene Peden: A Lady for all Seasons
Gary S. Brown, Virginia Polytechnic Institute and State University

10:00 BREAK

10:20 The First Course in Electromagnetics
Donald G. Dudley, University of Arizona

10:40 Vision, Persistence, Commitment, and Leadership: The Role of Irene in the Development of CAEME
Magdy F. Iskander, CAEME

Scattering

C. Torres-Verdin and R. H. MacPhie

8:20 Axial Scattering of a Coated Tubular Cylinder
H.-M. Lee, Naval Postgraduate School

8:40 Plane Wave Scattering by Two Coalescing Spheres
R. H. MacPhie, T. Do-Nhat, University of Waterloo

9:00 Methods for Evaluating the Performance of Electromagnetic Scattering Prediction Codes
J. P. Meyers, A. J. Terzuoli, Jr., G. C. Gerace, P. F. Auclair, Air Force Institute of Technology

9:20 A Fast and Accurate Three-Dimensional Multiple Scattering Approach Involving Large Conductivity Contrasts
Tarek M. Habashy, Carlos Torres-Verdin, Schlumberger-Doll Research*

9:40 Modeling Three-Dimensional Scattering Using TransFinite Elements
Xingchao Yuan, Dinkow Sun, Zoltan Cendes, Ansoft Corporation*

10:00 BREAK

10:20 Electromagnetic Scattering From a Cylindrical Inlet Using Combined Field Integral Equations
M. D. Deshpande, C. J. Reddy, C. R. Cockrell, F. B. Beck, NASA-Langley Research Center*

10:40 Higher Order Statistics of Scattering from Small Clutter Cells
Lisa Mockapetris, Rome Laboratory, Hanscom AFB

11:00 On the Rayleigh Approximation for Electromagnetic Scattering from a Small Scatterer
M. A. Karam, A. Stogryn, Aerojet Electronic Systems Plant*

11:20 Electromagnetic Scattering from a Continuously Inhomogeneous Random Medium with Cylindrical Symmetry
Magali Jean, MOTHESIM Society

11:40 Parameter Estimation of Frequency Dependent Scatterers
JW Odendaal, PA van Jaarsveld, University of Pretoria*

12:00 Iterative Minimum Discrepancy Method for Three-Dimensional Scattering Problems
Alexander B. Samokhin, Moscow Institute Radiotechnics

Electromagnetics in Biology and Medicine

C. M. Rappaport and K. M. Chen

8:20 EM Wave Life-Detection System for Post Earthquake Rescue Operations
K. M. Chen, Y. Huang, A. Norman, P. Ilavarasan, Michigan State University*

8:40 FDTD Investigation of Electromagnetic Fields on Tumors in the Head
D. B. Dunn, A. J. Terzuoli, Jr., G. C. Gerace, Air Force Institute of Technology, C. M. Rappaport, Northeastern University

9:00 Mathematical Aspects of EEG Modeling by the Finite Element Method
Kassem A. Awada, David R. Jackson, Jeffery T. Williams, Donald R. Wilton, University of Houston

9:20 Currents Induced in a Person Standing Under or Near a High-Voltage Power Line
Ronold W. P. King, Harvard University, Sheldon S. Sandler, Northeastern University*

9:40 Modeling of Magnetic Field Stimulation of the Human Cortex
M. A. Abdeen, M. A. Stuchly, University of Victoria*

10:00 BREAK

10:20 Currents Induced in a Growing Monolayer of Biological Cells in Low Frequency Magnetic Fields
A. El-Sayed, M. A. Stuchly, University of Victoria

10:40 Computation of the Response of a Realistic Human Body Model to ELF Electric Fields
Trevor W. Dawson, Kris Caputa, Maria A. Stuchly, University of Victoria*

11:00 Magnetic Shielding of Cellular Phone Antennas
El-Badawy El-Sharawy, Craig Birtcher, Arizona State University*

11:20 Review and Recent Results for in-vivo Ocular Polarimetry in the Presence of Biological Chiral Media
Sunghoon Jang, Laurence R. Welch, Martin D. Fox, Dan Censor, University of Connecticut*

Special Session

Antenna Applications of Photonics

M. L. VanBlaricum and J. Moellers

8:20 Broadband Photonic Links for Shipboard Antenna Applications
S. A. Pappert, C. K. Sun, R. J. Orazi, M. H. Berry, NCCOSC*

8:40 Fiber-Optic Links for the VHF and UHF Antenna Manifolds
Drew E. Flechsig, Irwin Abramovitz, Westinghouse Electric Corporation*

9:00 Optical Analog Links using Linearized Modulators for Antenna Remoting
G. E. Betts, F. J. O'Donnell, K. G. Ray, Lincoln Laboratories*

9:20 Array Antenna Time-Steered by a Fiber-Optic Beamformer
Michael Y. Frankel, Ronald D. Esman, Naval Research Laboratory*

9:40 Wavelength-multiplexed fiberoptic true time delay steering system
A. Goutzoulis, D. Davies, J. Zomp, P. Hrycak, A. Johnson, J. Moellers, Westinghouse*

10:00 BREAK

10:20 Remote Optical control and Tuning of Antenna Elements
Michael L. VanBlaricum, Catherine J. Swann, Thomas L. Larry, Toyon Research Corporation*

10:40 Digitally Reconfigurable Antenna
Kris W. Turk, California Microwave, Inc.

11:00 A Review of the Photonic Reconfigurable Antenna Technologies Study
Rosemary N. Edwards, William C. Nunnally, University of Texas at Arlington, Bryan C. Miller, Robert B. Liechty, L. Keith Robinette, E-Systems*

11:20 Optical Control of Scanning Oscillator Arrays
H. C. Chang, R. A. York, University of California at Santa Barbara*

Room	Monday AM
Catamaran	URSI-B Session 1 Guided Waves
Salon 1/2	AP Session 1 Scattering I
Salon 3	AP Session 2 Finite Element
Salon 4	AP Session 3 Adaptive Antennas I
Salon 5	AP Session 4 Space Antennas and Arrays
Salon A	AP Session 5 Broadband Antennas
Salon B	Joint Session 1 Wavelets in Electromagnetics I
Salon C	Joint / URSI-B Session 2 Microstrip Antenna Design and Analysis
Salon D	AP Session 6 Time Domain Numerical Methods (FDTD) I
Salon E	URSI-B Session 2 Transients
Salon F	Joint / URSI-E Session 3 Coupling and Shielding AP Session 7 Nearfield Measurements
Schooner/ Sloop	URSI-B Session 3 Antennas I
Trimaran/ Brigantine	AP Session 8 Terrestrial and Tropospheric Propagation and Scattering
Yawl	

Room	Monday PM
Catamaran	URSI-B Session 4 Chiral Media
Salon 1/2	AP Session 9 Scattering II
Salon 3	AP Session 10 Adaptive Antennas II
Salon 4	AP Session 11 Computer-Aided Engineering Education
Salon 5	AP Session 12 Cellular and Terrain-Dominated Propagation AP Session 13 Indoor Propagation
Salon A	URSI-A Session 5 Antennas and EM FIeld Metrology
Salon B	AP Session 14 Horn and Slot Antennas
Salon C	AP Session 15 Microstrip Antenna Arrays
Salon D	AP Session 16 Time Domain Numerical Methods (FDTD) II
Salon E	AP Session 17 Space Antennas AP Session 18 Circular and Ring Microstrip Antennas
Salon F	URSI-B Session 6 Antennas II
Schooner/ Sloop	Joint / URSI-B Session 4 Higher Order Modeling in Computational Electromagnetics
Trimaran/ Brigantine	AP Session 19 MM Waves and Dieletric Resonator Antennas
Yawl	AP Session 20 Random Media and Microstrip Components AP Session 21 TLM and Method of Lines

Room	Tuesday AM
Catamaran	AP Session 22 Electromagnetic Theory I
Salon 1/2	AP Session 23 Time Domain Methods (Various)
Salon 3	URSI-B Session 7 Finite Element Methods
Salon 4	URSI Session 8 Tribute to Professor Irene Peden
Salon 5	AP Session 24 Reflector Antennas I
Salon A	URSI-B Session 9 Scattering
Salon B	AP Session 25 Antenna Arrays I
Salon C	AP Session 26 Microstrip Patch Antenna Analysis Joins / URSI-B Session 5 Microstrip Antenna Analysis Methods
Salon D	AP Session 27 Microstrip Patch Antennas II
Salon E	AP Session 28 Parallel and Distributed Computation in Electromagnetics
Salon F	URSI-K Session 10 Electromagnetics in Biology and Medicine
Schooner/ Sloop	URSI-B Session 11 Antenna Applications of Photonics
Trimaran/ Brigantine	URSI-F Session 12 Apmosphere and Propagation for Satellite and Terrestrial Communications
Yawl	Koint / URSI-B Session 6 Scattering by Wedges I

Room	Tuesday PM
Catamaran	URSI-F Session 13 Remote Sensing of Terrestrial
Salon 1/2	URSI-B Session 14 Hybrid Numerical Methods
Salon 3	AP Session 29 Electromagnetics Education
Salon 4	AP Session 30 Antennas for Personal Communications
Salon 5	AP Session 31 Reflector Antennas II
Salon A	URSI-B Session 15 High Frequency Techniques
Salon B	URSI-A Session 16 Material Characterization
Salon C	AP Session 32 Microstrip Couplers and Filters URSI-B Session 17 Microstrip I
Salon D	Joint / URSI-B Session 7 Parallel and Distributed Computation in Electromagnetics
Salon E	AP Session 34 Integral Equation Methods and Layered Media Green's Functions
Salon F	AP Session 35 Active Arrays
Schooner/ Sloop	Joint Session 8 Image Reconstruction From Real Data
Trimaran/ Brigantine	AP Session 36 Electromagnetic Theory II
Yawl	Joint / URSI-B Session 9 Scattering by Wedges II

Room	Wednesday AM
Catamaran	
Salon 1/2	Plenary Session On to the Next Millenium
Salon 3	
Salon 4	
Salon 5	
Salon A	
Salon B	
Salon C	
Salon D	
Salon E	
Salon F	
Schooner/ Sloop	
Trimaran/ Brigantine	
Yawl	

Room	Wednesday PM
Catamaran	URSI-B Session 18 Theoretical Electromagnetics I
Salon 1/2	AP Session 37 Antenna Arrays II
Salon 3	Joint / URSI-B Session 10 In Honor of Victor Galindo-Israel
Salon 4	AP Session 38 Mobile Satellite Communications Antennas
Salon 5	URSI-B Session 19 Finite Difference Time Domain Methods
Salon A	URSI-A Session 20 Impulse Radar
Salon B	AP Session 39 Hybrid Methods
Salon C	AP Session 40 Analysis and Synthesis of Microstrip Patch Antennas
Salon D	URSI-B Session 21 Microstrip II
Salon E	AP Session 41 Numerical Algorithms AP Session 42 C A D of Microwave Components
Salon F	URSI-G Session 22 Propagation Phenomenology AP Session 43 Biomedical Applications
Schooner/ Sloop	AP Session 44 Inverse Scattering
Trimaran/ Brigantine	AP Session 45 Frequency Selective Surfaces
Yawl	

Room	Thursday AM
Catamaran	AP Session 46 Remote Sensing AP Session 47 Random Media and Rough Surface Scattering
Salon 1/2	URSI-B Session 23 Integral Equation Techniques
Salon 3	URSI-F Session 24 Propagation Modeling and Measurements for Mobile / Personal Comm. Services
Salon 4	AP Session 48 Antenna Measurements
Salon 5	URSI-E Session 25 Noise and Interference Control
Salon A	URSI-B Session 26 PML Absorbing Coundary Conditions for
Salon B	URSI-B Session 27 Inverse Scattering
Salon C	AP Session 49 Nonplanar Microstrip Antennas
Salon D	AP Session 50 Antenna Arrays III
Salon E	URSI-B Session 28 Wavelets in Electromagnetics II
Salon F	AP Session 51 Dielectric Properties Measurements
Schooner/ Sloop	AP Session 52 Wideband Antennas
Trimaran/ Brigantine	AP Session 53 Scattering III
Yawl	

Room	Thursday PM
Catamaran	
Salon 1/2	URSI-D Session 29 Microwaves - Photonics - Electronics
Salon 3	AP Session 54 Wireless Communications Technology
Salon 4	AP Session 55 Antenna Arrays IV
Salon 5	AP Session 56 Scattering IV
Salon A	URSI-B Session 30 Numerical Methods Time and Frequency Domains
Salon B	URSI-B Session 31 Boundary Conditions
Salon C	AP Session 57 Coupling to Microstrip Patch Antennas
Salon D	AP Session 58 Multiple Frequency and Wide Band Microstrip Patch Antennas
Salon E	Joint / URSI-G Session 11 Transionospheric Propagation
Salon F	URSI-B Session 32 Transient Electromagnetic Wave Propagation in Dispersive Media
Schooner/ Sloop	URSI-B Session 33 Theoretical Electromagnetics II
Trimaran/ Brigantine	Joint / URSI-B Session 12 Rough Surfaces
Yawl	

Apmosphere and Propagation for Satellite and Terrestrial Communications

J. Neves and A. Webster

8:20 Propagation Channel Characterization at 20 GHz and XPD Frequency Scaling
A. Rocha, J. Neves, University of Aveiro

8:40 Estimation of Rain Structure and Ice Anisotropy by Means of a Multipolarization Radiowave Beacon
Aldo Paraboni, Centro Studi Telecomunicazioni Spaziali Piazza, Antonio Martellucci, Alberto Aresu, Fondazione Ugo Bordoni, Rolf Jakoby, Deutsche Bundespost Telekom*

9:00 Attenuation and Noise Temperature of Non-Rainy Atmosphere for Satellite Communication Systems
Francesco Barbaliscia, Marina Boumis, Antonio Martellucci, Fondazione Ugo Bordoni*

9:20 Modelling of Attenuation Dynamic Measured by Radiometers of the Colorado Research Network
Ed. R. Westwater, NOAA/ERL/ETL, Ermanno Fionda, Antonio Martellucci, Fondazione Ugo Bordoni*

9:40 Extended Observations of Fading on Microwave Communications Links
Alan R. Webster, The University of Western Ontario

10:00 BREAK

10:20 Lidar Atmospheric Measurements of Tropospheric Refractivity during Developing Santa Ana Winds
D. W. Blood, C. R. Philbrick, Penn State University*

10:40 Detection and Physical Description of Clouds Making use of Laser-Diode Ceilometer, and Upper Air and Surface Meteorological Data
Francesco Barbaliscia, Marina Boumis, Ermanno Fionda, Fondazione Ugo Bordoni*

Electromagnetics Education

M. F. Iskander and A. Prata

1:20 A Software Tool for Cost Optimization of Microwave Radio Relay Link
Ashraf Gasim Elsid Abdalla, Ahmad Faizal Mohd. Zain, Universiti Kebangsaan Malaysia

1:40 RASCAL - Interactive Freeware for Designing Classical Single- and Dual-Reflector Antennas
Aluizio Prata, Jr., Yung-Hsiang Lee, University of Southern California, Kenneth W. Brown, Hughes Aircraft Company*

2:00 Enhancement of High Frequency and Microwave Laboratories Through the Introduction of Multimedia
Atef Z. Elsherbeni, Asem Mokaddem, Mark D. Tew, University of Mississippi*

2:20 Computation and Graphic Visualization of Plane-Wave K-Space Spectra and Far-Field Patterns with MATLAB 4.0
Ross A. Speciale, Redondo Beach

2:40 A Student Programming Project: Part I - Computation of the Steady State Radar Cross Section of Realistic Targets
J. D. Pursel, P. M. Goggans, University of Mississippi*

3:00 BREAK

3:20 A Student Programming Project: Part II - Computation of One- and Two-Dimensional Radar Images of Realistic Targets
J.D. Pursel, P.M. Goggans, University of Mississippi*

3:40 Using Object-Oriented Programming in Computational Electromagnetic Codes
M. L. Zimmerman, P. Mallasch, Analex Corporation

4:00 Animation / Quiz Approach in Computer Laboratory for Undergraduates in Electromagnetics
M. A. Stuchly, J. McCulloch, W. A. Keddy, University of Victoria*

4:20 Mixed Analytical-Numerical Calculations of Microstrip Antenna Green's Function Using Personal Computers C-language
M. Naguib, H. Ghali, H. El Hennawy, Ain Shams University*

Tuesday PM AP Session 30 Salon 4

Antennas for Personal Communications
S. S. Stuchly and Y. Rahmat-Samii

1:20 Performance of Circularly Polarized Patch Antennas for Personal Satellite Communications Including Biological Effects
M. A. Jensen, BYU, Y. Rahmat-Samii, UCLA*

1:40 Modeling of Hand-Held Receiving Antennas in the Presence of a Human Head
Xavier Thiry, Raj Mittra, University of Illinois

2:00 An Enhanced-Bandwidth Integrated Dual L Antenna for Mobile Communications Systems - Design and Measurement
K. Virga, Y. Rahmat-Samii, UCLA*

2:20 A Wideband Dual Meander Sleeve Antenna
M. Ali, S. S. Stuchly, K. Caputa, University of Victoria*

2:40 Gain Improvement of a Planar Inverted F Antenna on a Handset by Passive Loading
M. Hirose, M. Miyake, Casio Computer Co.*

3:00 BREAK

3:20 A Wide Band Microstrip Antenna for Portable Cordless Telephones
Mohamed Sanad, Nokia Mobile Phones

3:40 2 GHZ Compact Antennas on Handsets
C. Sabatier, France Telecom/CNET PAB

4:00 Analytical Study of a Planar Loop Antenna with U-Shape Notch
Hitoshi Itakura, Koichi Tsunekawa, NTT Mobile Communications Network Inc., Japan*

4:20 Experimental Study of Cavity-Backed Dielectric Disk and Ring Omnidirectional Antennas for Indoor Wireless Communications
Hongming An, Tongqing Wang, Renato G. Bosisio, Ke Wu, Ecole Polytechnique de Montreal*

4:40 Application of Non-uniform FDTD Method to PCS Antennas
N.T. Sangary, E.A. Navarro, C. Wu, J. Litva, McMaster University

5:00 A Dielectric-Loaded Miniature Antenna for Microcellular and Personal

Communications
Yue-ping Zhang, Terry Kin-chung Lo, Yeong-ming Hwang, The Chinese University of Hong Kong*

Tuesday PM AP Session 31 Salon 5

Reflector Antennas II
D. C. Jenn and M. A. Thorburn

1:20 Coaxially Fed Dual-Frequency Horn for Offset Parabolic Reflector
M. Johansson, P-S. Kildal, Chalmers University of Technology*

1:40 Quasi-Non-Time-Differentiating Reflector Antennas for Short-Pulse Applications
Allen Wang, Hughes Aircraft Company, Aluizio Prata, Jr., University of Southern California*

2:00 Global vs. Bandlimited Basis Functions in the Analysis of Axisymmetric Reflector Antennas
F. L. Teixeira, J. R. Bergmann, Catholic University of Rio de Janeiro*

2:20 Near Field Measurement of a Facet-Approximated Reflector Antenna
Tadashi Takano Suguru Someya, Institute of Space and Astronautical Science, Eiji Hanayama, Polytechnic University*

2:40 Application of the PTD to Cross-Polarization Prediction in a Shaped-Reflector Antenna
S.G. Hay, CSIRO

3:00 BREAK

3:20 An Inexpensive Scanning Dual Offset Reflector Antenna with Rotating Flat Subreflector
E. Lorenzo, A. G. Pino, Universidad de Vigo, C. M. Rappaport, Northeastern University

3:40 Synthesis and Analysis of Shaped ADE Reflectors by Ray Tracing
Yueh-Chi Chang, Myung Jin Im, Raytheon Company

4:00 The Analysis of a Segmented Paraboliodal Reflector with Hexagonal Flat Sections
Alexander C. Brown, Jr., Phoenix, Arizona

4:20 Analysis of Uncontrollable Errors on the Performance of a Large Segmented Active Surface Reflector Antenna for Millimeter Wavelength
German Cortes-Medellin, Universidad de Los Andes, David R. Smith, University of Massachusetts-Lowell

4:40 Contoured Beam Design by Subreflector Shaping Only
H. Zhou, South Bank University

5:00 Eagle Vision Antenna Design
Gerry A. Seck, Datron/Transco, Inc.

Tuesday PM AP Session 32 Salon C

Microstrip Couplers and Filters
C. Nguyen and B. Rawat

1:40 Dispersion Analysis of Three-Line Microstrip Couplers
Lukang Yu, Banmali Rawat, University of Nevada*

2:00 Semi-Emperical Design Equations for Three-Line Microstrip Coupler
Lukang Yu, Banmali Rawat, University of Nevada*

2:20 Miniaturized Multi-Octave Band-Pass Filters
Cam Nguyen, Texas A&M University*

2:40 A High-Selectivity Low-Pass Filter Using a New Coplanar Waveguide with Tuning Septums
Pang-Cheng Hsu, C. Nguyen, Texas A&M University*

Tuesday PM AP Session 33 Salon C

Microstrip Patch Antennas on Unusual Substrates
L. P. B. Katehi and W. D. Burnside

3:20 Microstrip Patch Antennas on Micromachined Low-Index Materials
R.F. Drayton, I. Papapolymerou, L.P.B. Katehi, University of Michigan*

3:40 Synthesis of Tapered Resistive Ground Plane for a Microstrip Antenna
R. G. Rojas, D. Colak, M. F. Otero, W. D. Burnside, The Ohio State University*

4:00 Scattering Reduction of a Microstrip Patch with an In-Plane Biased Ferrite Cover Layer
David Hung Y Yang, University of Illinois at Chicago, Jesse A Castaneda, Phraxos R&D, Inc.

4:20 Cylindrical-Rectangular Patch on Fiber-Enhanced Composite Ground Plane
Jean-Fu Kiang, National Chung-Hsing University

4:40 Role of Chiral Images in the Design of Planar Integrated Structures
A. Toscano, L. Vegni, Third University of Roma*

Tuesday PM AP Session 34 Salon F

Integral Equation Methods and Layered Media Green's Functions

A. A. Kishk and M. Orefice

1:20 Regularization of EFIE for Printed Structures: A Numerical Approach
Giuseppe Vecchi, Paola Pirinoli, Mario Orefice, Politecnico di Torino

1:40 Spectral-domain MoM using Subsectional Singular Functions
G. Vecchi, P. Pirinoli, L. Matekovits, M. Orefice, Politecnico di Torino

2:00 Method of Moment Solution of Multilayered Microstrip Structures with Thin Layers using Quasi-Static Images
J. Sercu, D. De Zutter, University of Ghent, J. Van Hese, N. Fache, HP-Belgium*

2:20 Radiation from 3D Sources in the Presence of 2D Composite Objects
Ahmed A. Kishk, University of Mississippi, Per-Simon Kildal, Chalmers University of Technology*

2:40 Modeling of a Cylindrical Wire Antenna With Flat End Caps Using a Rigorous Moment Method Technique
J. A. Huffman, D. H. Werner, The Pennsylvania State University*

3:00 BREAK

3:20 Wide-Band Evaluation of Communications Antennas Using [Z] Matrix Interpolation with the Method of Moments
Kathleen Virga, Yahya Rahmat-Samii, UCLA*

3:40 Mixed-Potential Integral Equation Technique for the Characterization of Microstrip Antennas Printed on Uniaxial Substrates
J. Plet, M. Drissi, J. Citerne, INSA/LCST*

4:00 Spectral Green's Functions for Multilayer Media in a Simple Form
Y. L. Chow, University of Waterloo, R. Faraji-Dana, S. Safavi-Naeini, University of Tehran, N. Hojjat, University of Waterloo

4:20 Efficient and Robust Approach for the Derivation of Closed-Form Green's Functions
M.I. Aksun, Bilkent University*

4:40 Frequency Derivatives of the Green's Functions of a Stratified Medium
J. Ureel, K. Blomme, D. DeZutter, University of Gent, J. Van Hese, HP-Alphabit*

Tuesday PM AP Session 35 Schooner/Sloop

Active Arrays
D. B. Rutledge and R. A. York

1:20 A 16-Element Tunnel Diode Grid Oscillator
Michael P. De Lisio, John F. Davis, Shi-Jie Li, David B. Rutledge, California Institute of Technology, James J. Rosenberg, Harvey Mudd College*

1:40 Generalized Scattering Matrices for Unit Cell Characterization of Grid Amplifiers and Device De-Embedding
Larry W. Epp, Raul M. Perez, R. Peter Smith, Jet Propulsion Laboratory*

2:00 Gain and Stability Models for HBT Grid Amplifiers
Cheh-Ming Liu, California Institute of Technology, Emilio A. Sovero, Rockwell International Corporation, Michael P. DeLisio, Alina Moussessian, David B. Rutledge, California Institute of Technology, James J. Rosenberg, Harvey Mudd College*

2:20 A Varactor Tuned 16-Element MESFET Grid Oscillator
A.C. Oak, Martin Marietta, R.M. Weikle, University of Virginia*

2:40 Monolithic Active Array Limitations Due to Substrate Modes
Donald W. Griffin, University of Adelaide

3:00 BREAK

3:20 A 100-Element MODFET Grid Amplifier
Michael P. De Lisio, Cheh-Ming Liu, Alina Moussessian, David B. Rutledge, California Institute of Technology, James J. Rosenberg, Harvey Mudd College*

3:40 Enhanced Scanning Range of Coupled Oscillator Arrays Utilizing Frequency Multipliers
Angelos Alexanian, Heng-Chia Chang, Robert A. York, University of California at Santa Barbara*

4:00 Coupled-Oscillator Scanning Technique for Receiver Applications
Xudong Cao, R.A. York, University of California at Santa Barbara*

Tuesday PM AP Session 36 Yawl

Electromagnetic Theory II
M. Gimersky and P. Chambelin

1:40 Tuning-Free Analysis of Planar Radiators Based on an Exact Numerical Evaluation of the Two-Dimensional Generalized Exponential Integral
Martin Gimersky, Smain Amari, Jens Bornemann, University of Victoria*

2:00 Analysis and Synthesis of Non-Uniform Waveguide by Tensorial Form of Maxwell's Equations
P. Chambelin, T. Dusseux, Alcatel Espace, R. Dusseaux, J. Chandezon, University of Clermont-Ferrand

2:20 The Direct Visualization of Complex Waves in Lossless Nonreciprocal Waveguides
B. Yu. Kapilevich, Tharek Abd. Rahman, University of Technology of Malaysia, T. N. Fedotova, Novosibirsk Telecommunication Institute

2:40 Full-Wave Analysis of Loaded Magnetron Oscillating Systems
A. E. Serebryannikov, D. M. Vavriv, Radio Astronomy Institute of Ukrainian Academy of Sciences*

Tuesday PM Joint/URSI-B Session 7 Salon E

Special Session

Parallel and Distributed Computation in Electromagnetics
T. Cwik and R. Mittra

1:20 Parallel Solution of Unstructured Sparse Finite Element Equations
N. Kapadia, B. Lichtenberg, J. A. B. Fortes, J. L. Gray, H. J. Siegel, K. J. Webb, Purdue University

1:40 Large Scale Finite Element Modeling Using Scalable Parallel Processing
Tom Cwik, JPL, Daniel Katz, Cray Research, Cinzia Zuffada, Vahraz Jamnejad, JPL

2:00 The Performance of Linear Algebra Routines on a Distributed Memory Massively Parallel Computer
Steven Castillo, Jay Martinez, William Dearholt, New Mexico State University*

2:20 Distributed Parallel Finite Difference Time Domain Calculations using Parallel Virtual Machine 3.2
V. Varadarajan, D. Oh, R. Mittra, University of Illinois at Urbana-Champaign*

2:40 Implementation of Advanced FDTD Methods on Parallel and Distributed Computers
Stephen D. Gedney, University of Kentucky, Faiza Lansing, Jet Propulsion Laboratory*

3:00 BREAK

3:20 Large Scale Integral Equation Modeling Using Scalable Parallel Processing
Tom Cwik, Jet Propulsion Laboratory, Daniel Katz, Cray Research, Inc. Jean Patterson, Jet Propulsion Laboratory*

3:40 Parallel Performance of the CARLOS-3D Method of Moments Code
J. M. Putnam, D. D. Car, McDonnell Douglas Corp., J. D. Kotulski, Sandia National Laboratories

4:00 Massive Parallelism is the Solution: Are We Kidding Ourselves?
Adrian S. King, Kent Lusted, Intel Corporation

4:20 Time and Space Parallel Solution of Maxwell's Equations on Massively Parallel MIMD Architectures
Michael A. Jensen, Brigham Young University, Amir Fijany, Jet Propulsion Laboratory, Yahya Rahmat-Samii, University of California at Los Angeles*

Tuesday PM Joint Session 8 Trimaran/Brigantine

Special Session

Image Reconstruction From Real Data
R. V. McGahan, R. Kleinman and M. Fiddy

1:20 Image Reconstruction from Ipswich Data
P. M. van den Berg, Delft University of Technology, R. E. Kleinman, University of Delaware*

1:40 Two-Dimensional Tomography Algorithms applied to the Ipswich Data
K. Belkebir, J. M. Elissalt, J. M. Geffrin, Laboratoire des Signaux et Systemes

2:00 Object Reconstruction from Far-Field Data Using Gradient and Gauss-Newton Type Methods
P. Lobel, CNRS/Universite de Nice-Sophia Antipolis, R. Kleinman, University of Delaware, Ch. Pichot, L. Blanc-Feraud, M. Barlaud, CNRS/Universite de Nice-Sophia Antipolis*

2:20 Microwave Tomography: Problems Related to Reconstructions from Experimental Data
J. Joachimowicz, J. Ch. Bolomey, A. Joisel, A. Franchois, M. Geleoc, SUPELEC/LSS*

2:40 On Modified Gradient Solution Methods Using the Binary Aspect of the Unknown Electromagnetic Parameters and Their Application to the Ipswich Data
B. Duchene, D. Lesselier, Laboratoire des Signaus et Systemes*

3:00 BREAK

3:20 Diffraction Tomography Reconstructions from Real Data
J. J. Stamnes, University of Bergen, L.-J. Gelius, Norwave Development AT, T. C. Wedberg, Norwegian Institute of Fisheries & Aquaqulture*

3:40 Processing Experimental Data with Local Shape Function Method and Distorted Born Iterative Method
C. C. Lu, W. C. Chew, University of Illinois*

4:00 Imaging of Unknown Targets from Measured Scattering Data
J. B. Morris, Rome Laboratory, D. A. Pommet, University of Massachusetts-Lowell, R. V. McGahan, Rome Laboratory, M. A. Fiddy, University of Massachusetts-Lowell

4:20 Application of Holographic Synthetic Aperture Radar Techniques to Monochromatic Swept-Angle Bistatic Data
Brian D. Jersak, Marc J. Byrd, Andrew J. Blanchard, Houston Advanced Research Center*

4:40 Three Dimensional Time Harmonic Electromagnetic Inverse Scattering: The Reconstruction of the Shape and the Impedance of an Obstacle
P. Maponi, Universita di Camerino, M.C. Recchioni, Universita di Ancona, F. Zirilli, Univesita di Roma "La Sapienza"*

5:00 An Improved MUSIC Algorithm for High Resolution Image Reconstruction
Fumie Kasahara, Hiroshi Shimotahira, ATR Optical and Radio Communications Research Laboratories*

Tuesday PM Joint/URSI-B Session 9 Yawl

Scattering by Wedges II
E. Marx and P. L. E. Uslenghi

3:20 Scattering by a Wedge with Variable Impedance Faces
G. Pelosi, Univ of Florence, G. Manara, P. Nepa, Univ. of Pisa*

3:40 A UTD Solution for the Diffraction of an Inhomogeneous Plane Wave Obliquely Incident on a Wedge
G. Manara, P. Nepa, University of Pisa, R. G. Kouyoumjian, The Ohio State University*

4:00 Solution for a DC Anomaly Caused by a Wedge in Conducting Ground
Keijo Nikoskinen, Mikko Flykt, Helsinki University of Technology*

4:20 Double Diffraction Coefficients for Source and Observation at Finite Distance for a Pair of Wedges
M. Albani, F. Capolino, S. Maci, Univ. of Florence, R. Tiberio, Univ. of Siena*

4:40 Diffraction at the Junction of a Two-Impedance Half-Plane
A.H. Serbest, Cukurova University, E. Luneburg, German Aerospace Research Establishment*

5:00 Further Notes on Electromagnetic Field Behavior Near Homogeneous Anisotropic Wedges

Yuad S. Brisker, Carey M. Rappaport, Northeastern University*

Remote Sensing of Terrestrial Media and Surfaces

K. Sarabandi and R. A. Simpson

1:20 A Coherent Scattering Model for Tree Canopies Based on the Fractal Theory
Yi-Cheng Lin, Kamal Sarabandi, University of Michigan*

1:40 Analysis and Application of Backscattered Frequency Correlation Function
Kamal Sarabandi, Adib Nashashibi, University of Michigan

2:00 Effective Permittivity of a Two-Dimensional Dense Random Medium: Comparison Between QCA and the Method of Moments
Paul Siqueira, Kamal Sarabandi, University of Michigan*

2:20 High Resolution Radar Rain Backscatter Measurements at NRL - Preliminary Report
William B. Gordon, Naval Research Laboratory

2:40 Application of Theoretical Models to Experimental Studies of Hydrometeors by Dual-Polarization Radars
A. B. Shupiatsky, S. V. Antipovsky, V. R. Megalinsky, Central Aerological Observatory

3:00 BREAK

3:20 Sensing of Ice Particles in Wintertime Thunderclouds Using C-Band Dual Polarization Radar
Yasuyuki Maekawa Osaka Electro-Communication University, Shoichiro Fukao, Kyoto University, Yasuo Sonoi, Kansai Electric Power Company, Katsunari Masukura, Ministry of Construction*

3:40 Experimental / Numerical Evaluation of Sky-Wave Directed Field for a Number of HF Antennas in the Vicinity of a Cliff
S. Saoudy, F. Hartery, D. Power, K. Hickey, Memorial University of Newfoundland*

4:00 FDTD Simulation of Scattering from Objects near a Dielectric Interface
J. E. Baron, G. L. Tyler, R. A. Simpson, Stanford University*

4:20 Coherent Multiple Scattering and Effective Polarization Anistropy of a Grass Layer
S. K. Kamzolov, V. L. Kouznetsov, The Moscow State Technical University of Civil Aviation

4:40 Radar Determination of Ocean State Parameters with Microwave Signal Doppler Spectrum (Quasispecular Backscattering)
M. B. Kanevsky, V. Yu. Karaev, Institute of Applied Physics, Russiam Academy*

Tuesday PM URSI-B Session 14 Salon 1/2

Hybrid Numerical Methods

X.-B. Xu and E. Heyman

1:20 Hybrid Ray-FDTD Moving Window Solution for Long Distance Modeling of Space-Time Wavepackets
B. Fidel, E. Heyman, R. Kastner, Tel-Aviv University, R. W. Ziolkowski, University of Arizona

1:40 An Investigation on the Electromagnetic Shielding of Sources Within a Ferromagnetic Pipe by a Hybrid Finite-Element and Unimoment Method Formulation Approach
Xiao-Bang Xu, Xiaomei Yang, Clemson University*

2:00 Using the Integral Form of Maxwell's Equations to Modify and Improve the FD-TD (2,4) Scheme
Mohammed F Hadi, Melinda Piket-May, University of Colorado at Boulder*

2:20 Study of Numerical Dispersion and Stability of the Discrete Surface Integral FDTD Method
H. Shi, J. L. Drewniak, University of Missouri-Rolla

2:40 Waveguide Coupler Modeling with the Discrete Surface Integral-FDTD Method
H. Shi, J. L. Drewniak, University of Missouri-Rolla

3:00 BREAK

3:20 A Modal Analysis Approach - An Exact Approach for the Investigation of the Causes of Spurious Solutions in Finite Element Techniques
C. F. Bunting, Old Dominion University, W. A. Davis, Virginia Polytechnic Institute and State University*

3:40 An Hybrid Finite Difference - Finite Volume Method for Solving Maxwell Equations in Time Domain
A. D. Kalfon, P. H. Klotz, Centre d'Etudes et de Recherches de Toulouse-ONERA*

4:00 Full-Wave Analysis and Design of Circular Waveguide Dual-Mode Filters by an Hybrid Technique Finite-Element Mode-Matching
J. R. Montejo Garai, J. Zapata, E. T. S. I. Telecomunicacion*

4:20 Computation of Wave Propagation on Microstrip Structures of Arbitrary Shape Using TLM and FEM
Jun Wei Lu, Derek Gray, David V. Thiel, Steven O'Keefe, Griffith University*

4:40 Method of Higher Order Basis Functions Applied to the MOM Portion of the SWITCH Code
Y. C. Ma, M. I. Sancer, G. E. Antilla, Northrop Corporation

5:00 Antenna Pattern Evaluations using a Hybridization of the Finite Element and High Frequency Methods
R. Kipp, S. W. Lee, DEMACO, T. Ozdemir, J. L. Volakis, University of Michigan, L. Kempel, J. Berrie, Mission Research Corporation*

Tuesday PM URSI-B Session 15 Salon A

High Frequency Techniques
A. F. Peterson and G. Pelosi

1:20 Extension of the Integral Equation - Asymptotic Phase Method to Three-dimensional Scattering
Kieth R. Aberegg, Andrew R. Peterson, Georgia Institute of Technology*

1:40 Scattering Matrix networks for the solution of high-frequency electromagnetic interaction problems with large structures
B. L. Michielsen, V. Gobin, ONERA*

2:00 Methods to Increase the Efficiency of a Planar Reflector
J. Shaker, L. Shafai, University of Manitoba*

2:20 Application of the Generalized Multipole Technique (GMT) to High-Frequency Electromagnetic Scattering from 3-D Perfectly Conducting and Dielectric Homogeneous Bodies of Revolution
J. M. Tranquilla, H. M. Al-Rizzo, University of New Brunswick*

2:40 TD-UTD Analysis of the Scattering from a Perfectly Conducting Finite Cylinder
Paul R. Rousseau, Prabhakar H. Pathak, The Ohio State University*

3:00 BREAK

3:20 Improving the Capabilities of High-Frequency Techniques with FEM
G. Pelosi, R. Coccioli, M. T. Suadoni, University of Florence, G. Manara, University of Pisa*

3:40 High Frequency Analysis of EM Scattering by Masts and Towers Present in Certain Propagation Enviornments
C. W. Chuang, P. H. Pathak, R. J. Burkholder, Ohio State University

4:00 Generalization of the Rubinowicz Ray Theory
P. Ya. Ufimtsev, Phraxos Research & Development, Inc., N. G. Alexopoulos, University of California at Los Angeles, J. A. Castaneda, Phraxos Research &*

Development, Inc.

4:20 Diffraction Principles in Design and Detection of Invisible Objects
P. Ya. Ufimtsev, Phraxos Research & Development, Inc.

4:40 Uniform Asymptotic Solutions for Whispering Gallery Mode Radiation from Smooth Concave-To-Convex Boundary
T. Ishihara, K. Goto, National Defense Academy, Japan*

5:00 Asymptotics of Creeping Waves in a Vicinity of the Surface Discontinuity
Ivan V. Andronov, University of St. Petersburg

Tuesday PM URSI-A Session 16 Salon B

Material Characterization
S. Riad and J. Chen

1:20 Intercomparison of Magnetic Material Characterization using the Transmission / Reflection Method in 7-MM and 14-MM Coaxial Air Lines
Claude M. Weil, Eric J. Vanzura, National Institute of Standards and Technology*

1:40 Determination of EM Parameters of Anisotropic Materials Using a Waveguide Probe System
C. W. Chang, K. M. Chen, J. Qian, D. P. Nyquist, Michigan State University*

2:00 Dielectric Characterization Using a Shorted Circular Waveguide Fed By a Coaxial Line
Mohammad A. Saed

2:20 Measurement of Complex Dielectric Permittivity using Microstrip Transmission Line
Richard B. Keam, W. S. Holmes, Industrial Research Ltd.

2:40 Field Analysis of High TC Superconducting Strip Transmission Lines
Jeffrey S. Herd, Rome Laboratory

3:00 BREAK

3:20 Time Domain Analysis of Skin Effect Losses in Transmission Lines
Sedki M. Riad, Mohammed Abd-el Rahman, Iman M. Salama, Virginia Polytechnic Institute*

3:40 Variable-Temperature Microwave Dielectric Properties of Isotropic and Anisotropic Materials

Tuesday PM URSI-B Session 17 Salon D

Microstrip I

A. C. Cangellaris and L. Shafai

1:20 Series Fed Microstrip Array Antenna
Babau R. Vishvakarma, Banaras Hindu University, Milind B. Mahajan, Indian Space Research Organization

1:40 High Gain Cavity Back Microstrip Antenna as Active Array Element
L. Shafai, A. Asi, University of Manitoba, D. J. Roscoe, Communications Research Centre*

2:00 Effect of Superstrate Thickness and Permittivity on Stacked Electromagnetic Coupled Patch Antennas
Kai-Fong Lee, Wei Chen, University of Toledo, R. Q. Lee, NASA Lewis Research Center*

2:20 A Microstrip Phased Array Antenna with Low Q Elements for Southern Coverage Using MSAT
Radha Telikepalli, Tim Musclow, Peter Strickland, CAL Corporation*

2:40 Time Domain Analysis of Microstrip Networks using a Rational Function Approach
Thomas Karle, Tapan K. Sarkar, Syracuse University

3:00 BREAK

3:20 Resonance Properties of Rectangular Patch in the Presence of Laminated Ground Plane
Jean-Fu Kiang, Chung-Yuan Kung, National Chung-Hsing University*

3:40 Double-Layer Circularly Polarized Microstrip Antenna with a Single Coaxial Feed
Choon Sae Lee, Southern Methodist University, Vahakn Nalbandian, Felix Schwering, US Army CECOM*

4:00 Numerical Analysis of a Waveguide Simulation of A Microstrip Phased Array Antenna on a Normally Biased Ferrite Substrate
Kang H. Lee, Sharad R. Laxpati, University of Illinois at Chicago*

4:20 Application of the PML Grid Truncation Scheme for the FDTD Analysis of Microstrip Patch Arrays
M. Pasik, Sandia National Laboratories, G. Aguirre, A. C. Cangellaris, University of Arizona*

4:40 A Time-Domain Iterative Method for Microstrip Antennas
I. Baracco, Ch. Pichot, A. Papiernik, M. Scotto, CNRS/Universite de Nice-Sophia Antipolis*

5:00 Improved Design of a Quadrature Hybrid Using an Elliptic Patch
K. L. Chan, F. A. Alhargan, S. R. Judah, University of Hull*

Wednesday AM Plenary Session 1 Salon 1/2

Special Session

On to the Next Millenium
W. A. Imbriale

8:35 Opening Remarks from the General Chair
William A. Imbriale, JPL

8:40 Low Earth Orbit Satellite Communications on the Information Superhighway
James R. Stuart, Teledesic

9:20 Future Antenna Engineering Challenges in Radio Astronomy; Bigger, Better Cheaper
Peter Napier, NRAO

10:00 BREAK

10:30 Mars Exploration: An Example of the Next Generation of Science Mission
Donna Shirley, JPL

11:00 Student Spacecraft
Paul Coleman, UCLA

11:30 Engineering Education and Industrial Competitiveness: A Synergistic Approach
Frank Wazzan, UCLA

Wednesday PM AP Session 37 Salon 1/2

Antenna Arrays II
A. I. Zaghloul and D. H. Schaubert

1:20 An Active Antenna Phased Array Doppler Radar with Tracking Capability
S.T. Chew, T. Itoh, UCLA*

1:40 Improved Radation Pattern for 28 GHz Omni-Directional Quasi-Optical Oscillator Array
Mark J. Vaughan, Richard C. Compton, Cornell University*

2:00 Parameter Study of Tapered Slot Antenna Arrays
D. H. Schaubert, J. Shin, University of Massachusetts, Amherst*

2:20 Optimal Partially Adaptive Sensor Array Processing
J. Scott Goldstein, Douglas B. Williams, Rome Laboratory, Douglas B. Williams,*

Georgia Tech.

2:40 Basic Design of Beam Tilting Radial Line Slot Antennas
M. Takahashi, M. Yoshiie, M. Abe, Musashi Institute of Technology, Japan*

3:00 BREAK

3:20 Planar Arrays for MSAT and INMARSAT Land Mobile Satellite Communications
P.C. Strickland, CAL Corporation

3:40 Fundamental Properties and Applications of Semi-Active Arrays
Per Olav Iversen, Peter de Maagt, Antoine Roederer, European Space Agency*

4:00 Coupling Coefficients and Active Element Patterns of Finite Waveguide Arrays
K.K. Chan, Chan Technologies, R.M. Turner, Defence Research Estb., K. Chadwick, Dept. of National Defence*

4:20 Modal Analysis of Rectangular Waveguide Phased Arrays
K.K. Chan, Chan Technologies, R.M. Turner, Defence Research Estb., K. Chadwick, Department of National Defence*

4:40 Intermodulation and Bit-Error Ratio Performance of a Ku-Band Multibeam High-Power Phased Array
E. C. Kohls, E. P. Ekelman, A. I. Zaghloul, F. T. Assal, COMSAT Laboratories*

Wednesday PM AP Session 38 Salon 4

Mobile Satellite Communications Antennas

A. N. Tulintseff and J. S. Colburn

1:20 Consideration on Design of Antenna Array with Cross Radiation Pattern
Shigeru Egashira, Takayuki Tanaka, Hiromasa Kawaguchi, Saga University, Shigeru Uchino, Harada Industry Co. Ltd.*

1:40 Bidirectional Collinear Antenna with Arc Parasitic Plates
Keizo Cho, Toshikazu Hori, Hajime Tozawa and Shinji Kiya, Nippon Telegraph and Telephone Corporation*

2:00 Analysis of a Square Helix Applicable to the Personal Satellite Communication Handset
J.S. Colburn, Y. Rahmat-Samii, UCLA*

2:20 Elliptical Curl Antennas In MSAT
Zhong-Hua Wang, Jean-Jacques Laurin, Renato G. Bosisio, Ecole Polytechnique de Montreal

2:40 Antenna Angle Error Correction to Radome Curvature
Kaichiang Chang, Raytheon Company

3:00 BREAK

3:20 Circularly Polarized Multibeam Radial Line Slot Antennas for Mobile Satellite Communication
Jun-ichi Takada, Tatsuya Yamamoto, Makoto Ando, Naohisa Goto, Tokyo Institute of Technology

3:40 U-Shaped Slots for Circularly Polarized Slotted Waveguide Array
K-S. Min, J. Hirokawa, M. Ando N. Goto, Tokyo Institute of Technology*

4:00 Spherical Microstrip Arrays for Mobile Satellite Communication
Probir K. Bondyopadhyay, NASA Johnson Space Center

4:20 An Analysis of a Circular Aperture Antenna Covered with a Dielectric Hemi-Spherical Shell Radome over Ground Plane
L. W. Li, P. S. Kooi, M. S. Leong, T. S. Yeo, X. Ma, National University of Singapore*

4:40 Microstrip Phased Array for Mobile Satellite Terminals
Daniel J. Bem, Pawel Kabacik, Technical University of Wroclaw, Poland*

5:00 A FOur Beam-Switched Planar Array Antenna for Mobile Terminals
Nobuhiro Kuga, Hiroyuki Arai, Yokohama National University*

Wednesday PM AP Session 39 Salon B

Hybrid Methods
K. A. Michalski and K. J. Webb

1:20 Hybrid Analysis (MM-UTD) of EM Scattering from Finned Convex Objects
M. Hsu, P. H. Pathak, The Ohio State University

1:40 Iterative Improvement of Physical Optics Hybrid Method - POHM Iterative
Richard E. Hodges, Yahya Rahmat-Samii, UCLA*

2:00 FEM / BEM-Hybrid Approach for Layerd Media
Thomas F. Eibert Volkert Hansen, Bergische Universitat*

2:20 A Hybrid FEM / MoM Approach for Analyzing Inhomogeneous Structures with Fine Features
U. Pekel, R. Mittra, University of Illinois, E. Ngai, T. Wells, A. Cohen, Electronic Space Systems Corp.

2:40 Hybrid Finite Element-Mixed-Potential Integral Equation-Discrete Complex Image Approach for Inhomogeneous Waveguides in Layered Media
J. Wu, K. A. Michalski, Texas A&M University*

3:00 BREAK

3:20 Hybridization of SBR and FEM for Scattering by Large Bodies with Cracks and Cavities
Jian-Ming Jin, Sean Ni, Shung-Wu Lee, University of Illinois*

3:40 An Exact Hybrid Numerical Boundary Condition for Electromagnetic Scattering Problems
Yinshang Liu, Kevin J. Webb, Purdue University*

Wednesday PM AP Session 40 Salon C

Analysis and Synthesis of Microstrip Patch Antennas
A. Z. Elsherbeni and D. P. Nyquist

1:20 Comparison Between Microstrip and Wire Antenne
A. Gharsallah, A. Bouallegue, Faculte des Sciences de Tunis, H. Baudrand, Ecole Polytechnique*

1:40 Optimization of Microstrip Open End
Franco De Flaviis, Ming-Ju Tsai, University of California, Los Angeles, Shih-Chang Wu, New Jersey Institute of Technology, Nicolaos G. Alexopoulos*

2:00 Surface Wave Mode Reduction For Rectangular Microstrip Antennas
I. Papapolymerou, R.F. Drayton, L.P.B. Katehi, University of Michigan*

2:20 An Automatic Mesh Complexity Reduction Scheme for the Derivation of Equivalent Circuits of Microstrip Interconnection Discontinuities
G. Coen, D. DeZutter, N. Fache, University of Gent*

2:40 An Improved Approach to Implement a Microstrip to Waveguide Transition
G. Zarba, G. Bertin, L. Accatino, P. Besso, CSELT*

3:00 BREAK

3:20 Application of Matrix Pencil Technique to Analysis of Microstrip
Z.A. Maricevic, T.K. Sarkar, Syracuse University*

3:40 FDTD Analysis of Active Circuits with Equivalent Current Source Approach
Chien-Nan Kuo, University of California at Los Angeles, Bijan Houshmand, Jet Propulsion Laboratory, Tatsuo Itoh, University of California at Los Angeles

4:00 Full Field and Quasi-TEM Time Domain Numerical Analysis of Coupled Microstrip Circuits
Joe LoVetri, Doru Mardare, University of Western Ontario, Atef Z. Elsherbeni, Charles E. Smith, University of Mississippi*

4:20 Cross-Polarization Analysis of Lossy Microstrip Resonators
John M. Damaschke, Smain Amari, Jens Bornemann, University of Victoria*

4:40 An Anaylsis of Leaky Modes Excited on Stripline Structures
D. Infante, D. P. Nyquist, Michigan State University*

Wednesday PM AP Session 41 Salon E

Numerical Algorithms
E. Blezynski and R. Kastner

1:20 Fast Multipole Method Solution of Three Dimensional Integral Equation
J. M. Song, W. C. Chew, University of Illinois, Urbana*

1:40 Fast Computation of 3D Inhomogeneous Scattered Field Using a Discrete BDG-FFT Algorithm
Hong Gan, W. C. Chew, University of Illinois, Urbana*

2:00 A Sparse Moment Method Technique for a Wide Class of Scattering Problems
Sunil S. Bindiganavale, John L. Volakis, The University of Michigan*

2:20 Matrix Thinning with Reduced Field Testing (RFT)
Raphael Kastner, Gabriela Nocham, Tel Aviv University*

2:40 The Lattice Gas Automata for Computational Electromagnetics
Nikhil Adnani, University of Manitoba, Neil R. S. Simons, Communications Research Centre, Ottawa, Greg E. Bridges, University of Manitoba*

3:00 Multi-Grid Method and Diakoptic Theory
C.F. Wang, D.G. Fang, Nanjing University of Science and Technology*

Wednesday PM AP Session 42 Salon E

C A D of Microwave Components
A. Prata and H-W. Yao

3:40 Branch Guide Coupler in Rectangular Coaxial Line
G. Bertin, L. Accatino, D. Merletti, CSELT*

4:00 Grating-Type Polarizers Using Small Number of Rectangular Grooves Optimized for Maximum Isolation
F. J. S. Moreira, Aluizio Prata, Jr., University of Southern California*

4:20 Numerical Design Technique for Waveguide T-junction in H-plane
J. Kim, H. Lee, H.K. Jung, S. Hahn, Seoul Nat'l University, C. Cheon, Kangwon Nat'l University, H. Kim, Soonchunhyang University*

4:40 Modeling Conducting Posts in Rectangular Waveguides for Filter Applications
Hui-Wen Yao, Chi Wang, Kawthar A. Zaki, University of Maryland

Wednesday PM AP Session 43 Salon F

Biomedical Applications
R. D. Nevels and N. K. Uzunoglu

3:20 Microwave Antenna Design for Myocardial Tissue Ablation Applications
Robert D. Nevels, Texas A&M University, Dickey Arndt, James Carl, George Raffoul, Johnson Space Center, Antonio Pacifico, Methodist Hospital, Houston, TX

3:40 Iterative Solutions of Three-Dimensional Electric Fields and Absorbed Powers inside a Human Body Illuminated by a Horn-Antenna Annular Phased Array
Tianquan Deng, Xiaoguo Liu, National University of Singapore

4:00 Power Deposition From Multiple Coupled Waveguide Applicators into a Multilayer Lossy Cylinder
K.S. Nikita, N.K. Uzunoglu, University of Athens*

4:20 GRATMA Method for Biomedical Applications: Comparison with the CGM-FFT
J. J. Mallorqui, M. Rodriguez, Universitat Politecnica de Catalunya*

Wednesday PM AP Session 44 Schooner/Sloop

Inverse Scattering
W. Chew and B. D. Jersak

1:20 Ground Penetration Radar Target Classification via Complex Natural Resonances
Chi-Chih Chen, Leon Peters, Jr., Walter D. Burnside, The Ohio State University*

1:40 Comparison of Layer-Peeling Inverse Scattering Using Three Derived Lattice Models of Multilayered Media
S. Giles, University of Toledo

2:00 Decomposition of Frequency Domain RCS Data Using a Damped Exponential Model
M.J. Gerry, E.K. Walton, Ohio State University*

2:20 Modified Gradient Profile Inversion Using H-polarized Waves
Wen Lixin, Ralph E. Kleinman, University of Delaware, Peter M. van den Berg, Delft University of Technology*

2:40 Effects of Phase Discontinuities in Banded Data when Generating Holographic Synthetic Aperture Radar Images
Brian D. Jersak, Marc J. Byrd, Brendan D. Krenek, Andrew J. Blanchard, Houston Advanced Research Center*

3:00 BREAK

3:20 Prediction-Correction Algorithm for Electromagnetic Imaging
Y. Liu, I.R. Ciric, University of Manitoba*

3:40 A Frequency-Hopping Approach for Microwave Imaging of Large Inhomogeneous Bodies
W. C. Chew, J. H. Lin, University of Illinois, Urbana

4:00 3D Inhomogeneous Inversion for Microwave Imaging Using Distorted Born Iterative Method and BCG-FFT
Hong Gan, W. C. Chew, University of Illinois, Urbana*

4:20 Reconstruction of One-Dimensional Lossy Dielectric Profiles
Giuseppe Mazzarella, Univ. di Cagliari, Gaetano Panariello, Univ. Federico II di Napoli*

4:40 Forward and Backward Propagators Applied to Direct and Inverse Scattering of the Scalar Field in the Resonance Region
G.F. Crosta, Universita' Degli Studi di Milano

5:00 An Iterative Numerical Algorithm for Electromagnetic Imaging
C. Su, J. Yang, Northwestern Polytechnical University*

Wednesday PM AP Session 45 Trimaran/Brigantine

Frequency Selective Surfaces
S. Berkeshli and D. R. Jackson

1:20 High Q Resonances in FSS
Alon S. Barlevy, Yahya Rahmat-Samii, UCLA*

1:40 Analysis of Frequency Selective Surface on Biased Ferrite Substrate
G.Y. Li, Y.C. Chan, City University of Hong Kong, T.S. Mok, Inchape Testing Service, J.C. Vardaxoglou, Loughborough University of Technology*

2:00 Analysis of Frequency Selective Surfaces with Ferrite Substrates
Y. Liu, C. G. Christodoulou, P. F. Wahid, University of Central Florida, N. E. Buris, Motorola Inc.*

2:20 Analysis of Frequency Selective Surfaces with Arbitrarily Shaped Apertures by Finite Element Method and Generalized Scattering Matrix
Manuel Lambea, Miguel A. Gonzalex, Jose A. Encinar, Juan Zapata, Universidad Politecnica de Madrid*

2:40 Exploitation of Symmetries in the Impedance Matrix for Moment-Method Analysis of Arbitrary Frequency-Selective Surfaces
Changhua Wan, Jose A. Encinar, Universidad Politecnica de Madrid*

3:00 BREAK

3:20 A Leaky-Wave Antenna Using a Two-Dimensional Periodic Array of Metal Patches
Antonio Ip, David R. Jackson, University of Houston

3:40 On the Analysis and Design of the Frequency Selective Surface for the N-Star Satellite KU / S-Shaped Reflector
S. Barkeshli, T. Smith, H. S. Luh, L. Ersoy, Space Systems/Loral*

4:00 Inter Orbit Link Antenna for the Artemis Satellite
P. Capece, A. Basile, R. Ravanelli, M. Di Fausto, Alenia Spazio, P. Foldes, Foldes Inc.

4:20 Performance Measurement of Frequency Selective Reflector Using Planar Near-Field Techniques
S Honma, S. Makino, Mitsubishi Electric Co., T. Itanami, NTT Wireless Systems

4:40 Scattering by a Two Dimensional Periodic Array of Conducting Rings on a Chiral Slab
T. Ege, University of Gaziantep

Wednesday PM Joint/URSI-B Session 10 Salon 3

Special Session

In Honor of Victor Galindo-Israel
Yahya Rahmat-Samii and Raj Mittra

1:20 Opening Remarks
Yahya Rahmat-Samii, UCLA, Raj Mittra, University of Illinois

1:40 Many-Faceted Contributions of Victor Galindo to the Analysis and Synthesis Problems Related to Reflector Antennas
Raj Mittra, University of Illinois*

2:00 High Performance, Low Cost Reflector Antennas
Warren L. Stutzman, Marco A.B. Terada, Virginia Polytechnic Institute and State University*

2:20 Examples of Shaped Reflectors from a New Shaping Method
Lynn Baker, Cornell University

2:40 Compensation of Gravity-Induced Structural Deformations on a Beam-Waveguide Antenna Using a Deformable Mirror
W. A. Imbriale, M. Moore, D. J. Rochblatt, W. Veruttipong, Jet Propulsion Laboratory*

3:00 BREAK

3:20 MBA versus Phased Array for Electronic Beamsteering
William C. Wong, TRW Electronics Systems & Technology Division

3:40 A Comparison of Two Spherical Wave Expansion Techniques Using the Circular Aperture as an Illustrative Example
R.G. Yaccarino, Hughes Aircraft, Sembiam R. Rengarajan, CSUN*

4:00 Modified Jacobi Polynomials in Analysis, Synthesis and Measurements of Antennas
Y. Rahmat-Samii, UCLA

4:20 Closing Remarks

Wednesday PM URSI-B Session 18 Catamaran

Theoretical Electromagnetics I
A. A. Oliner and N. Engheta

1:20 Can One "Hear" the Handedness or Topology of A Knot?
D. L. Jaggard, O. Manuar, University of Pennsylvania

1:40 Fractional Derivatives, Fractional Integrals and Electrostatic Image Methods
Nader Engheta, University of Pennsylvania

2:00 Applications of Fractional Calculus to Fields of Finite-Size Sources
Nader Engheta, University of Pennsylvania

2:20 Puzzles Relating to Radiation Fields Within the Spectral Gap Between Surface Waves and Leaky Waves
A. A. Oliner, Polytechnic University, D. R. Jackson, University of Houston, H. Ostner, Technische Universitat Munchen*

2:40 A Derivation of Recursion Relations of the Translational Theorems for Scalar and Vector Spherical Harmonics
Kristopher T. Kim, Rome Laboratory

3:00 BREAK

3:20 Field Penetration and Charge Distribution in a Polarized Semiconductor Sphere
Thomas Wong, Xinhua Hu, Illinois Institute of Technology*

3:40 Solution for Radiation Characteristics of a Thin Truncated Dielectric Disk Antenna by the Method of Steepest Descent and Weinner-Hoff Technique
Chinmoy Das Gupta, A. C. Trivedi, Indian Institute of Technology, Anup Gogoi, Assam Engg. College*

4:00 Total Surface Current on a PEC Angular Sector
W. J. Koh, R. J. Marhefka, The Ohio State University ElectroScience Laboratory*

4:20 Rigorous Solution to the Problem of Dielectric Slab Natural Modes Scattering from Compound Resonant Cylindrical Inhomogeneity
Andrey S. Andrenko, Ukranian Academy of Sciences

4:40 Free Electromagnetic Oscillations and Waves of Gratings and Scattering Anomalous Regimes
Vasily V. Yatsik, Institute of Radiophysics & Electronics of the National Academy of Sciences of Ukraine

5:00 Normal Modes in Open Waveguides with Non-compact Boundaries
Youri V. Shestopalov, Vadim V. Lozhechko, Moscow State University*

Wednesday PM URSI-B Session 19 Salon 5

Finite Difference Time Domain Methods
R. W. Ziolkowski and R. Janaswamy

1:20 An Investigation of Arbitrary Grid Finite Difference Time Domain Algorithms
A. M. Davidson, J. LoVetri, The University of Western Ontario, N. R. S. Simons, Communications Research Centre*

1:40 3D FDTD Treatment of Perfect Electric Conductors
J. Anderson, M. Okoniewski, S. S. Stuchly, University of Victoria*

2:00 An Optimized Finite Difference Scheme for Time Domain Maxwell's Equations
Ramakrishna Janaswamy, Naval Postgraduate School, Yen Liu, NASA Ames Research Center*

2:20 SVD Based Prony Hildebrand Technique for CFDTD Processing
Ali Asi, Lotfollah Shafai, University of Manitoba*

2:40 Simulation and Measurement of High Speed Digital Test Modules
M. Piket-May, J. Mix, D. Barnhart, University of Colorado at Boulder, Roger Gravrok, Kevin Thomas, Cray Research Inc.*

3:00 BREAK

3:20 An FDTD Simulator for Ground-Probing Radars
Zhubo Huang, Kenneth Demarest, Richard Plumb, Pawan Chaturvedi, The University of Kansas*

3:40 An Explicit Finite Element Time Domain Method Using Whitney Forms
Jin-Fa Lee, Zachary Sacks, Worcester Polytechnic Institute*

4:00 A Non-Dissipative Upstream Biased Scheme for Time Domain Computational Electromagnetics
Brian T. Nguyen, Philip L. Roe, University of Michigan*

4:20 An Accelerated Algorithm for the Time Domain Analysis of Guided Wave Problems Involving Ferrites
*M. Okoniewski *, University of Victoria, M. Mrozowski, Technical University of Gdansk*

Wednesday PM URSI-A Session 20 Salon A

Impulse Radar
J. P. Hansen and L. Peters

1:20 Ground Penetrating Radar Antennas
Leon Peters, Jr., Chi-Chih Chen, Frank Paynter, The Ohio State University*

1:40 Time-Domain Imaging of Radar Targets using Ultra-Wideband or Short Pulse Radars
Y. Dai, E. J. Rothwell, D. P. Nyquist, K. M. Chen, Michigan State University*

2:00 Calibration of an Impulse Radar Scattering Range with Conducting and Dielectric Canonical Targets: Sphere, Cube and Knife Edge
M. Piette, E. Schweicheir, Royal Military Academy Brussels, A. Vander Vorst, Univ. Cath. de Louvain*

2:20 Aspect Angle Sensitivity of Backscatter Measured by an Ultrawideband Synthetic Aperture Radar for Detection of Obscured Targets
Ravinder Kapoor, U. S. Army Research Laboratory, N. Nandhakumar, University of Virginia*

2:40 Ultrawideband, Impulse Driven X-Band Clutter Measurement Radar
J. P. Hansen, M. Sletten, K. Scheff, Naval Research Laboratory*

3:00 BREAK

3:20 Enhanced Detection of Radar Targets in a Realistic Sea Clutter Environment Using E-Pulse Clutter Cancellation
G. Wallinga, E. J. Rothwell, D. P. Nyquist, K. M. Chen, A. Norman, Michigan State University*

3:40 On a New Family of E-Pulses for UWB Radar Target Discrimination
Sergey Primak, Ben-Gurion University of the Negev, Margarita Horenian*, Library of the Russian Academy of the Science*

4:00 Matching Score Properties Between Range Profiles of High Resolution Radar Targets
Hsueh-Jyh Li, Yung-Deh Wang, National Taiwan University*

Microstrip II

C. G. Christodoulou and J. L. Volakis

1:20 FD-TD Analysis of Microstrip Antennas with Ferrite Substrates
T. Spreckic-Zugec, C. G. Christodoulou, University of Central Florida*

1:40 Radiation Patterns of Microstrip Antennas on Very Small Ground Planes
W. Zhou, P. F. Wahid, C. G. Christodoulou, University of Central Florida*

2:00 Input Impedance of a Microstrip Wrap-Around Antenna on a Conical Surface
D. N. Meeks, P. F. Wahid, University of Central Florida*

2:20 Computation of Radiation Pattern of Microstrip Patch Antennas on Complex Bodies
Sean Ni, Jian-Ming Jin, Shung-Wu Lee, University of Illinois at Urbana-Champaign*

2:40 An Efficient Hybrid FEM Formulation for Analysis of Cavity-Backed Thin Spiral Slot Antenna
Jian Gong, John L Volakis, University of Michigan*

3:00 BREAK

3:20 The Sinusoidal Microstrip Patch Antenna
Mohammad A. Saed, State University of New York at New Paltz

3:40 Gain Calculations for Large Microstrip Antenna Arrays using Different Feed Networks
Mohammad Shahid, Alakananda Paul, Howard University*

4:00 Wire-Grid Modeling of Single- and Double-Layered Perforated Microstrip Antenna
H. Moheb, InfoMagnetics Technologies Corp., L. Shafai, University of Manitoba*

4:20 A Study of Microstrip Antennas on Very High Permitivity Substrate and Very Small Ground Plane
Alessandro Perrotta,Motorola, Ahmad Hoorfar, Villanova University*

4:40 Analysis of Cylindrical Patch Microstrip Antenna with Circular Polarization by FD TD Method
Yasuhiro Kazama, Tamotu Suda, Japan Radio Co., Ltd., Nagayoshi Morita, Chiba Institute of Technology*

5:00 A Radiation Mode Expansion Formulation of Radiated Fields From Microstrip Line Discontinuities
Nagayoshi Morita, Chiba Institute of Technology

Wednesday PM URSI-G Session 22 Salon F

Propagation Phenomenology
F. T. Djith

1:20 The Polar Cap Ionosphere Above 80 Degrees Invariant Latitude
L. E. Montbriand, Communications Research Centre

1:40 An Investigation of Lightning-Induced Ionospheric Effect Using RF Diagnostics
K. M. Groves, J. V. Rodriguez, PL/GPIA, J. C. Foster, MIT Haystack Observatory, J. M. Quinn, PL/GPIA*

2:00 Measurements of Sprites and Blue Jets with High-Frequency Diagnostics
Frank T. Djuth, Geospace Research, Inc.

2:20 Formation and Relaxation of a Stratified Structure in the Ionospheric Plasma During its Heating (Theoretical and Experimental Investigations)
N. Blaunstein, Ben Gurion University of the Negev, G. S. Bochkarev, IZMIRRAN

2:40 Spatial and Dynamical Properties of the Ionospheric Plasma Response to Processes Arising Due to the Nonlinear Interaction of Two UHF Waves
V. V. Yevstafiev, Institute of Solar-Terrestrial Physics

Thursday AM AP Session 46 Catamaran

Remote Sensing
J. S. Verdi and D. Farina

8:40 A Wide-Band Six-Port Polarimetric Measurement System
T-J. Chen, Chung Shan Institute of Science and Technology, T-H. Chu, National Taiwan University*

9:00 VHF Propagation Experiment Measurement System Description
D. Farina, J. Bull, Flam & Russell, J. Wilcox, J. Vance, Science Application Int. Corp.*

9:20 VHF Propagation Experiment - Polarization Dependence of Forward Sea Scatter Near Grazing Incidence
J.J. Wilcox, J. Vance, Science Applications Int. Corp., D. Farina, J. Bull, Flam & Russell*

9:40 Computer-Aided Location and Identificaiton of Discharge Sources
S. Mathini, Royal Institute of Technology

Thursday AM AP Session 47 Catamaran

Random Media and Rough Surface Scattering
K. Sarabandi and C. H. Chan

10:20 Experimental Studies of Dense Media Scattering
John R. Kendra, Kamal Sarabandi, Fawwaz T. Ulaby, University of Michigan*

10:40 A Sparse-Matrix Canonical-Grid Method for Scattering by Many Randomly Located Cylindrical Scatterers
C. H. Chan, L. Tsang, University of Washington*

11:00 Full Wave Transmission Scatter Cross Sections for Random Rough Surfaces - Comparisons with Numerical Solutions
Ezekiel Bahar, Bom Son Lee, University of Nebraska-Lincoln

11:20 Double Scatter Radar Cross Sections from Two Dimensional Random Rough Surfaces-High Frequency Approximation
M. El-Shenawee, Electronics Redearch Institute, Cairo, E. Bahar, University of Nebraska-Lincoln*

11:40 Scatter Cross Sections for Sea Surfaces Characterized by Pearson-Moskowitz Spectral Density Function A New Unified Full Wave Approach
Ezekiel Bahar, Yuzhi Zhang, University of Nebraska-Lincoln

Thursday AM AP Session 48 Salon 4

Antenna Measurements
M. S. Gatti and D. Geen

8:20 Experimental Demonstration of the Effects of an Electric Thruster Plasma Plume on Microwave Propagation
K. M. Lambert, Analex Corporation, A. J. Zaman, F. M. Curran, NASA Lewis Research Center*

8:40 Design, Construction and Performance of a Small, Low Cost Anechoic Measuring System for Research Applications
D. Geen, D. Smith, University of Northumbria*

9:00 Phase-Cetner Effects on WIde-Band Horn Pattern Measurements in Small Anechoic Chambers
P. Ramanujam, L. F. Lopez, L. R. Fermelia, R. L. Reynolds, Hughes Space and Communications Company*

9:20 Input Impedance Measurements of Helical Antennae in the L-Band
E. Vassilikos, S. H. Al-Charchafchi, Cranfield University

9:40 A Radio Telescope for the Calibration of Radio Sources at 32 GHz
Mark Gatti, Scott R. Stewart, James G. Bowen, Eric B. Paulsen, Jet Propulsion Laboratory*

10:00 BREAK

10:20 Test Jigs and Measurements for the Scanning Antenna System of the Multifrequency Imaging Microwave Radiometer M.I.M.R.
Fabio Massimo Marinelli, Alenia Spazio S.p.A.

10:40 An Analysis of Range DIstance Requirements for Large ANtenna Measurements by the Use of the Transient Characteristics
S. Skulkin, Yu. Sorpov, Radiophysical Research Institute, Russia*

Thursday AM AP Session 49 Salon C

Nonplanar Microstrip Antennas
D. T. Auckland and R. C. Hall

8:20 A Procedure to Calculate the in-situ Contribution to Body Scattering Caused by Conformal Cavity-Backed Apertures
D. T. Auckland, M. Gosse, Atlantic Aerospace Electronics Corp.*

8:40 Analysis of the Spherical-Circular Microstrip Antenna with an Annular-Ring Parasitic Patch
Hong-Twu Chen, Horng-Dean Chen, Tsurng-Jeng Chang, Yuan-Tung Cheng, Chinese Military Academy*

9:00 Dual Patch Microstrip Antenna on a Conical Surface
Wagner Gones Barbose, Attilio Jose Giarola, State University of Campinas*

9:20 Mixed Potential Green's Functions for Cylindrical Microstrip Structures
R. C. Hall, C. H. Thng, Boulder Microwave Technologies, Inc., D. C. Chang, Polytechnic University of Brooklyn*

9:40 Radiation Efficiency of Conformal Microstrip Antennas on Cylindrical Surfaces
G. Gottwald, W. Wiesbeck, University of Karlsruhe*

10:00 BREAK

10:20 Analysis of Microstrip Open-end and Gap Discontinuities on a Cylindrical Body
Hua-Ming Chen, Kin-Lu Wong, National Sun Yat-Sen University*

10:40 Analysis of Cylindrical Printed Slot and Slot-coupled Microstrip Antennas
Ruenn-Bo Tsai, Kin-Lu Wong, National Sun Yat-Sen University*

11:00 Input Impedance Calculation of Cylindrical Rectangular Microstrip Antenna Using GTLM Theory
Chih-Yu Huang, Yu-Hua Liu, Kin-Lu Wong, National Sun Yat-Sen University*

11:20 Input Impedance of a Slot-coupled Multilayered Hemispherical Dielectric Resonator Antenna
Nan-Cheng Chen, Kin-Lu Wong, National Sun Yat-Sen University*

11:40 Microstrip Antenna on a Spherical Surface: A New Formulation of the Problem
Probir K. Bondyopadhyay, NASA Johnson Space Center

Thursday AM AP Session 50 Salon D

Antenna Arrays III
R. S. Chu and R. Haupt

8:20 A Finite Array of Ring-Slot Elements in a Ground Plane
R. S. Chu, J. J. Lee, Hughes Aerospace and Electronics Co.

8:40 Array Current Distributions to Generate Flat-Topped Beams
B. Preetham Kumar, G. R. Branner, UC Davis*

9:00 Analysis and Design of a Multi-Band Phased Array Using Multi-Feed Dipole Elements
Ruey S. Chu, Kuan M. Lee, Allen Wang, Hughes Aerospace & Electronics Co.*

9:20 Effects on Scan Blindness of Full and Partial Crosswalls between Notch Antenna Array Unit Cells
Gregory J. Wunsch, Daniel H. Schaubert, University of Massachusetts, Amherst*

9:40 Target Movement Simulation for Testing Mono-Pulse Radar
B.K. Sarkar, S.S. Kakatkar, A. Agarwal, IIT, Bombay*

10:00 BREAK

10:20 Optimisation of Aperture Distributions for Difference Patterns
F. Ares, A. Vieiro, E. Moreno, Universidad de Santiago, S. R. Rengarajan, CSUN*

10:40 Optimization of Subarray Amplitude Tapers
Randy Haupt, USAF Academy

11:00 Extension of Orchard's Pattern Synthesis Technique for Overdetermined Systems
F. Ares, A. Vieiro, E. Moreno, Universidad de Santiago, S.R. Rengarajan, CSUN*

11:20 Simple Evaluation of Mutual Slot Couplings in a Slotted Waveguide Planar Array Antenna
K. Sakakibara, J. Hirokawa, M. Ando, N. Goto, Tokyo Institute of Technology*

Thursday AM AP Session 51 Salon F

Dielectric Properties Measurements
S. Bringhurst and E. Walton

8:20 Thin Sample Dielectric Properties Measurement using Open-Ended Coaxial Probes and FDTD Calculations
Shane Bringhurst, Magdy F. Iskander, University of Utah*

8:40 Dielectric Constant Measurements of Dielectric Substrates at Cryogenic Temperature
G. Mascolo, R. Flamini, Alenia Spazio S.p.A

9:00 Synthetic Dielectric Material for Broadband-Selective Absorption and Reflection
William A. Janos, Huntington Beach, CA

9:20 Antenna Applications of 3M Thin Film Artificial Dielectric
E. Walton, H-W Tseng, L.W. Henderson, The Ohio State University*

9:40 Conductivity Estimation by Neural Network
Wai L. Ko, Raj Mittra, University of Illinois

10:20 Measurements and Theory of Reflection and Transmission in Bianisotropic Omega Composites
S. A. Tretyakov, T. G. Kharina, A. A. Sochava, St. Petersburg State Technical University, S. Bolioli, ONERA-CERT*

Thursday AM AP Session 52 Schooner/Sloop

Wideband Antennas
W. Stutzman and T. Milligan

8:20 Electronically Steeragle YAGI-UDA Micro Strip Patch Antenna Array
Derek Gray, Jun Wei Lu, David V. Thiel, Griffith University, Nathan, Australia*

8:40 Characteristics of Ice-Covered for Yagi-Uda Antenna
Haruo Kawakami, Gentei Sato, Antenna Giken Co. Ltd., Shozo Sumihiro, Shibaura Institute of Technology*

9:00 One-Point-Fed Circularly Polarized Yagi-Uda Loop Array
Y. Ojiro, K. Hirasawa, University of Tsukuba*

9:20 Analysis of Normal Mode Helical Antenna on Finite Ground Plane
S. H. Zainud-Deen, Riyadh College of Telecommunication, K. H. Awadalla, Jeddah College of Telecommunication, H. A. Sharshar, Menoufia University*

9:40 Polarization Losses in Normal Mode Helical Antenna
S. H. Zainud-Deen, Riyadh College of Telecommunications

10:00 BREAK

10:20 Experimental and Theoretical Studies of a DR Loaded Helical Antenna
H.T. Hui, E.K.N. Yung, Y.M Bo, City University of Hong Kong*

10:40 Closed Form Solution for the Asymmetrical T-Antenna
A. I. Bahnacy, Menoufia University, M. N. I. Fahmy, Cairo University, S. H. Zainud-Deen, Riyadh College of Telecommunication, K. H. Awadalla, Jeddah College of Telecommunication

11:00 Combining a Biconical with a Polarizer to Expand Bandwidth
Liang Tiesheng, Chen Yipeng*, Fend Yan, Electromagnetic Science Institute*

11:20 On the Problem of Dielectric-Coated Thin-Wire Antennas
S. A. Adekola, A. I. Mowete, University of Lagos, Nigeria*

Thursday AM AP Session 53 Trimaran/Brigantine

Scattering III
H. Ling and J. L. Volakis

8:20 Multi-Aspect Range Profile Interpolation for the Shooting and Bouncing Ray Technique
R. Bhalla, H. Ling, The University of Texas, Austin*

8:40 3D Scattering Center Extraction from Xpatch
R. Bhalla, H. Ling, The University of Texas, Austin*

9:00 Radar Response of Missile-Shaped Targets
S. Kashyap, J. Stanier, G. Painchaud, Defence Research Establishment, A. Louie, S&S Software*

9:20 Generation of Point Scatterer Models Using PTD / SBR Technique
Shuen-Yih Wang, Shyh-Kang Jeng, National Taiwan University*

9:40 RCS Calculations, Transformations & Comparisons Under Spherical & Plane Wave Illumination
Zhang Hai Ying, Gateway Technologies Pte Ltd.

10:00 BREAK

10:20 Ellipsoidal Surface Characterization for Validating the UTD Formulation
R. Choudhury, R. M. Jha, National Aerospace Laboratories

10:40 Parallelization Strategies for the UTD Codes
K. J. Vinoy, R. M. Jha, National Aerospace Laboratories

11:00 A Fock-Function Representation of the Fields Induced on an Impedance or Coated Cylindrical Surface by a Z-Directed Point Source
Paul E. Hussar, IIT Research Institute

11:20 Residue-Series Computation of Lit-Region Fields Via a Novel Function
Paul E. Hussar, IIT Research Institute

11:40 Parameters of the Generalized Symmetry and Linearity for Radar Target
J. Yang, C. W. Su, S.M. Lin, Northwestern Polytechnical University*

12:00 Computation of RCS from a Flat Plate Covered with Radar Absorbing Materials
L.C. Wu, W.X. Zhang, Southeast University, M.G. Wang, Xidian University*

Thursday AM URSI-B Session 23 Salon 1/2

Integral Equation Techniques
D. R. Wilton and S. M. Rao

8:20 An Efficient Preconditioner for Iterative Solution of Dense Matrices in Electromagnetics
V. Varadarajan, Raj Mittra, University of Illinois, John Murphy, Nick Jennings, British Aerospace Ltd.*

8:40 Extrapolation Technique for Solving Large Body Scattering Problems and Its Application to Bodies of Revolution
Zwi Altman, Raj Mittra, University of Illinois, Daniel Bouche, CEA*

9:00 Fast Integral Equation Solver Using Plane-Wave Basis Representation Along the Steepest Descent Path
E. Michielssen, W. C. Chew, University of Illinois*

9:20 A New Technique to Generate Sparse Matrix Using the Method of Moments - Application to Two-Dimensional Problems
G. K. Gzohard, S. M. Rao, Auburn University*

9:40 A New Technique to Generate Sparse Matrix Using the Method of Moments - Wire Scattering Problems
Sadesiva M Rao, Griffin K. Gothard, Auburn University*

10:00 BREAK

10:20 Surface Integral Formulation for Calculating Conductor and Dielectric Losses of Dielectric Filled Waveguides

Tanmoy Roy, Tapan K. Sarkar, Syracuse University, Madhavan Swaminathan, IBM*

10:40 New Uncoupled Integral Equations for the Radially-Graded Dielectric Sphere
M. S. Viola, University of Akron

11:00 Electrostatic Solution for Three-Dimensional Arbitrarily-Shaped Inhomogeneous Bodies in an Impressed Field Using FIT / MEI
John H. Henderson, S. M. Rao, Auburn University*

11:20 Effects of Laminated Ground Plane on Resonance Frequencies of Wraparound Patch Resonator
Jean-Fu Kiang, Chung-Yuan Kung, National Chung-Hsing University*

11:40 Implementation of a Parallel Processing Computational Electromagnetic Code Based on a Method of Moments Approach
D. I. Kaklamani, V. Kouloulias, A. Marsh, N. K. Uzunoglu, National Technical University of Athens*

12:00 Approximate Method of Solution of the Input Impedance of Wideband Chopped Conical Dipole by Means of Moment Method
Chinmoy Das Gupta, P. C. Das, A. C. Trivedi, Indian Institute of Technology*

Thursday AM URSI-F Session 24 Salon 3

Propagation Modeling and Measurements for Mobile/ Personal Comm. Services

J. C. Webster and E. R. Westwater

8:20 L-band Propagation Measurement at Very Low Altitude and Comparison to SEKE Propagation Model
Sean W. Gilmore,John C. Eidson, MIT Lincoln Laboratory*

8:40 A Comparison of the Longley-Rice and SEKE Propagation Models
John C. Eidson, M.I.T. Lincoln Laboratory

9:00 Prediction of VHF / L-Band Radio Wave Propagation in Urban and Suburban Environment
N. Blaunstein, Ben Gurion University of the Negev, M. Levin, Tadiran Ltd.

9:20 Near Range Radio Wave Propagation Prediction in Urban Area
Hing-On Ngai, Wong-Hing Lam, The University of Hong Kong*

9:40 Harmonic Signal's Level and Phase Cross Correlation Analytical Description by Electromagnetic Ground Wave Propagation
Valery V. Pechenin, Alexey A. Andrejev, Kharkov Aviation Institute*

10:00 BREAK

10:20 PCS System Design Issues in the Presence of Microwave POFS
Solyman Ashrafi, Tom Tran, A. Richard Burke, Moffet, Larson & Johnson, Inc.*

10:40 Field Simulator for Reproduction of Propagation Environment
Hiroyuki Arai, Yokohama National University

11:00 Dipole Antenna Radiation Patterns in a Concrete Building at 800 to 2900 MHz for Indoor Wireless Communications
Hsing-Yi Chen, Yeou-Jou Hwang, Yuan-Ze Institute of Technology*

11:20 Modeling of 3D In-Building Propagation by Ray Tracing Technique
Gong Ke, Xu Rui, Tsinghua University

Thursday AM URSI-E Session 25 Salon 5

Noise and Interference Control
J. L. Drewniak and E. Asari

8:20 EMI Sources Resulting from Finite Impedance Reference Structures
J. L. Drewniak, T. H. Hubing, T. P. Van Doren, University of Missouri-Rolla, J. D. Shaw, Allison Transmission - Division of General Motors*

8:40 Modelling and Simulation of Weibull Distributed Radar Clutter by Means of Stochastic Differential Equation
Valerii Kontorovich, Centro de Investigacion y de Estudios Avanzados del I. P. N., Vladimir Lyandres, Sergey Primak, Ben-Gurion University of the Negev, Margarita Horenian*, Library of the Russian Academy of the Science*

9:00 Modelling and Simulation of K-Distributed Radar Clutter by Means of Stochastic Differential Equation
*Valerii Kontorovich, Centro de Investigacion y de Estudios Avanzados del I. P. N., Vladimir Lyandres, Sergey Primak *, Ben-Gurion University of the Negev, Margarita Horenian*, Library of the Russian Academy of the Science*

9:20 Enhanced Skynoise Mitigation via Adaptive Beamforming
Gary A. Somers, Allan O. Steinhardt, Lincoln Laboratory, Massachusetts Institute of Technology*

9:40 Detecting Technologies and Characteristics of Meteorological Noises Related with Weather
Eikichi Asari, Hokkaido College of Arts and Sciences

10:00 BREAK

10:20 Receiving Communication Signals in the Presence of Man-Made Noises with Nonlinear Blind Spatial Separation

P. V. Gorev, The Joint Laboratory of NPP "Polyot" and Radiophysical Research Institute

10:40 Fast Adaptive Algorithms for Compensation of Time-Varying Interferences in Arrays
Boris B. Pospelov, Alexander Yu. Zaitsev, Kharkov Aviation Institute*

11:00 A Combined Reference Method for Adaptive Spatial Processing of Communication Signals in the Presence of Man-Made and Noisy Interferences
P. V. Gorev, The Joint Laboratory of NPP"Polyot" and Radiophysical Research Institute

Thursday AM URSI-B Session 26 Salon A

Special Session

PML Absorbing Coundary Conditions for Time and Frequency Domains

K. S. Yee and R. Mittra

8:20 Opening Remarks
Kane Yee, Lockheed Palo Alto Research Laboratory, Raj Mittra, University of Illinois

8:40 Extension of FD-TD Simulation Capabilities using the Berenger PML ABC
Daniel S. Katz, Cray Research, Inc., Christopher E. Reuter, Rome Laboratory/ ERST, Eric T. Thiele, University of Colorado, Rose M. Joseph, Allen Taflove, Northwestern University

9:00 Applying Berenger's Perfectly Matched Layer (PML) Boundary Condition to Non-Orthogonal FDTD Analyses of Planar Microwave Circuits
Stephen D. Gedney, Alan Roden, University of Kentucky*

9:20 Numerical Investigations of the PML Layer for Mesh Truncation in FDTD
Jonathon C. Veihl, Raj Mittra, University of Illinois*

9:40 Experiments on the Perfectly Matched Layer Boundary Condition in Modeling Wave Propagation in Waveguide Components
Zhonghua Wu, Jiayuan Fang, State University of New York at Binghamton*

10:00 BREAK

10:20 FDTD / PML Modeling of HIRF Interactions with Embedded Cavity-Backed Apertures
Richard W. Ziolkowski, David C. Wittwer, The University of Arizona*

10:40 Analysis of Perfectly-Matched Layers Using Lattice EM Theory in a

Discretized World
W. C. Chew, J. M. Jin, University of Illinois*

11:00 Performance Characterization of a Perfectly Matched Anisotropic Absorber for Frequency Domain FEM Applications
D, Kingsland, R. Dyczij-Edlinger, J. F. Lee, R. Lee, Worcester Polytechnic Institute*

11:20 A Finite Element Frequency Domain (FEFD) Formulation with Perfectly Matched Layer (PML) for Mesh Truncation
U. Pekel, R. Mittra, University of Illinois*

11:40 Improving the PML Absorbing Boundary Condition with Optimal Complex Mapping of the Normal Coordinate
Carey M. Rappaport, Northeastern University

12:00 Discussion

Thursday AM URSI-B Session 27 Salon B

Inverse Scattering
T. M. Habashy and W. C. Chew

8:20 Different Spatial Interative Methods for Microwave Inverse Scattering
P. Lobel, CNRS/Universite de Nice-Sophia Antipolis, R. Kleinman, University of Deleware, Ch. Pichot, L. Blanc-Feraud, M. Barlaud, CNRS/Universite de Nice-Sophia Antipolis*

8:40 The Reconstruction of Scattering Potentials from Incomplete Data: A New Look at the Fundamental Theorem of Diffraction Tomography
Tarek Habashy, Schlumberger-Doll Research, Emil Wolf, University of Rochester*

9:00 Processing of Ultrasonic Data with Electromagnetic Inverse Algorithm
W. C. Chew, C. C. Lu, University of Illinois, G. P. Otto, ThermoTrex Corporation*

9:20 Processing Experimental Data with Local Shape Function Method and Distorted Born Interative Method
C. C. Lu, W. C. Chew, University of Illinois*

9:40 Bistatic Polarimetric Extension of GO / PO and GTD / PTD Inverse Scattering Theories to Aerial RCS Analyses in Wideband POL-SAR Image Interpretation
Wolfgang-M. Boerner, University of Illinois at Chicago, Frederic A. Molinet Societe Mothesim

10:00 BREAK

10:20 A Modified Approach in Input Waveform Shaping for Target Identification
Gonul Turhan Sayan, Kemal Leblebicioglu, Serhat Inan, Middle East Technical University*

10:40 Simulation of Inverse Scattering by Clouds and Precipitation for 10 GHz Pulse Airborne Radar
Felix J. Yanovsky, Kiev International University of Civil Aviation

Thursday AM URSI-B Session 28 Salon E

Wavelets in Electromagnetics II
R. D. Nevels and F. X. Canning

8:20 A Wavelet Multilevel Formulation for Electromagnetic Scattering
Gaofeng Wang, Tanner Research, Inc.

8:40 Wavelet Basis Allows Diagonal Preconditioners for the EFIE
Francis X. Canning, James Scholl, Rockwell Science Center

9:00 A Comparison of Several Method of Moments Wavelet Basis Sets for Electromagnetic Scattering
R. D. Nevels, J. C. Goswami, A. K. Chan, C. K. Chui, Texas A&M University*

9:20 A Computationally Efficient Method Using Intervallic Wavelets for the Solution of Surface Integral Equations
Guangwen Pan, University of Wisconsin, Milwaukee

9:40 Analysis of Coplanar Waveguide Using Wavelet-Like Basis Functions
Subba R. Kunasani, Cam Nguyen, Texas A&M University*

Thursday PM AP Session 54 Salon 3

Wireless Communications Technology
J. E. Richie and R. B. Waterhouse

1:20 Up-Link Polarization Diversity and Antenna Gain Measurement of Hand-Held Terminal
Masayuki Nakano, Toshio Satoh, Nippon Idou Tsushin Corporation, Hiroyuki Arai, Yokohama National University

1:40 Two Methods for Estimating the Diversity Characterisitics of Built-in Antennas for Mobile Communication Equipment
Tadahiko Maeda, Syuichi Sekine, Shuichi Obayashi, Tasuku Morooka, Toshiba Research and Development Center*

2:00 A 2-D Ray Tracing Model for the Characterization of Spatial and Time-Domain Properties of the Indoor Propagation Channel
Michael L. Tobin, James E. Richie, Marquette University*

2:20 An SBR/Image Approach to Indoor Radio Propagation Modeling

S-H. Chen, S-K. Jeng, National Taiwan University*

2:40 The Effects of Reinforced Concrete Walls/Floors on Wireless personal communications Systems (PCS)
Michael Yan Wah, Chia, National University of Singapore

3:00 BREAK

3:20 Characterization of Indoor Radio Propagation Environments by Cluster Analysis as Preprocessing for Neural Network Model
Qin Zhou, A. K. Y. Lai, Chinese University of Hong Kong*

3:40 Genetic Algorithm Optimization of Wireless Communication Networks
J.M. Johnson, Y. Rahmat-Samii, UCLA*

4:00 A Method of Evaluating Spectrum Utilization in the VHF and UHF Bands
V.S. A Adeloye, Brunel University

4:20 Demonstration of a Millimeter-Wave Wireless Link Incorporating Microstrip Patches and a Novel Optical Feeding Technique
D. Novak, Z. Ahmed, University of Melborne, R. B. Waterhouse, Royal Melbourne Institute of Technology

Thursday PM AP Session 55 Salon 4

Antenna Arrays IV

J. Piotr Starski and R. L. Eisenhart

1:20 Calibration Block for Digital Beam Forming Antenna
J. Piotr Starski, Chalmers University of Technology

1:40 Investigation of Various Feed Structures for Linear Arrays of Dielectric Resonator Antennas
A. Petosa, J.S. Wight, Carleton University, R.K. Mongia, A. Ittipiboon, Carleton University*

2:00 A Generalised Projection Technique for the Synthesis of Conformal Arrays
O. M. Bucci, G. D'Elia, G. Romito, Universita di Napoli*

2:20 A Concentric Array Wide-Band Radial Line Slot Antenna with Matching Terminating Slots
T. Yamamoto, M. Ando, N. Goto, Tokyo Institute of Technology*

2:40 A Very Small Aperture Concentric Array Radial Line Slot Antenna
M. Ando, M. Ueno, N. Goto, Tokyo Institute of Technology, Y. Yoshida, T. Yoshimoto, M. Suzuki, Toppan Printing Co., Ltd.*

3:00 BREAK

3:20 Mutual Coupling Effects and Radiation Characteristics of a Linear Array of Dielectric Resonator Elements Fed by Coaxial Probes
G. P. Junker, A. W. Glisson, A. A. Kishk, University of Mississippi*

3:40 Phased Array Scanning Performance Simulation
R.L. Eisenhart, Eisenhart & Associates, P.K. Park, Hughes Missle Systems*

4:00 Linear Array Synthesis: A Complex Lagrange Multipliers Approach
J.J. Moncada, Northrop Grumman Corporation

4:20 Center-fed Grid Array Antennas
H. Nakano. L. Oshima, H. Mimaki, Hosei University, K. Hirose, Shonan Institute of Technology, J. Yamauchi, Hosei University

4:40 A New Technique of Analysis of Unequally Spaced Linear Arrays
B. Preetham Kumar, G. R. Branner, University of California, Davis*

Thursday PM AP Session 56 Salon 5

Scattering IV
D. P. Nyquist and R. C. Hall

1:20 Scattering From a Spherical-Circular Microstrip Antenna
Hong-Twu Chen, Tsurng-Jeng Chang, Yuan-Tung Cheng, Chinese Military Academy*

1:40 Radar Cross Section of Multilayer Patch and Aperture Coupled Patch Antennas
R.C. Hall, D.I. Wu, Boulder Microwave Technologies*

2:00 The Use of Huygens' Equivalence Principle for Solving 3D Volume Integral Equation of Scattering
Cai-Cheng Lu, Weng Cho Chew, University of Illinois*

2:20 Efficient Representation of Induced Currents on Large Scatterers Using Complex Exponential Functions
Zwi Altman, Osamu Hashimoto, Eric Michielssen, Raj Mittra, University of Illinois*

2:40 Transient Scattering of a Beam from a Periodic Surface
A. Norman, D.P. Nyquist, Michigan State University, East Lansing

3:00 BREAK

3:20 Scattering Analysis of Multi-Layered Dielectric Bodies of Revolution - Iterative Method
Hyung-Gi Na, Hyo-Tae Kim, Pohang University of Science and Technology*

3:40 An Improvement on Wave-Function Expansion Analysis for EM Scattering

from a Conducting Body
C.H. Cheng, Zhejiang University, W.X.Zhang, Southeast University*

4:00 The Fast Algorithm of Method of Lines in Analyzing the FSS with Oblique Incidence
Y. Long, H.Q. Zhu, D.G. Fang, Nanjing University of Science and Technology*

4:20 Investigation of EM Scattering by Obstacles on Substrate Surface Using Discrete Sources Method
Yu. A. Eremin, N. V. Orlov, Moscow State University

4:40 Singular Integral Equations and Three-Dimensional Problems of Electromagnetic Scattering
A. Samokhin, Moscow Institute Radiotechnics*

5:00 Simple Iteration Method for Solving the Problems of LF Electromagnetic Scattering
A. Samokhin, Moscow Institute Radiotechnics*

Thursday PM AP Session 57 Salon C

Coupling to Microstrip Patch Antennas
W. Wiesbeck and J. R. Mosig

1:20 Radiation by Aperture Antennas of Arbitrary Shape Fed by a Covered Microstrip Line
Chinglung Chen, Nicolaos G. Alexopoulos, University of California, Los Angeles*

1:40 Triplate-Fed Arbitrarily-Shaped Annular Ring Slot Antennas
Chinglung Chen, Nicolaos G. Alexopoulos, University of California, Los Angeles*

2:00 Radiation Properties of Ring Microstrip Antenna Fed by Symmetrical Cross Slot
M. Sawamura, M. Tabata, M. Haneishi, Saitama University*

2:20 Analysis of a Cavity-Backed Coaxial Array of Ring-Slot Antennas
N. Nikolic, J.S. Kot, CSIRO*

2:40 Hole-Coupled Patch Antennas
G. Di Massa, E. Bencivenni, G. Campaniello, Univ. della Calabria, G. Mazzarella, Univ. di Cagliari*

3:00 BREAK

3:20 Design Considerations for Dual Polarized Aperture-Coupled Microstrip Patch Antennas
F. Rostan, W. Wiesbeck, University of Karlsruhe*

3:40 Analysis of Two Aperture Coupled Antennas with Thick Ground Planes
Pamela R. Haddad, David M. Pozar, University of Massachusetts, Amherst*

4:00 Modeling of Multilayered Aperture-Coupled Planar Antennas
Y. Brand, J. R. Mosig, Swiss Federal Institute of Technology*

4:20 Simplified Analysis of Aperture Coupled Microstrip Antenna Fed by Dielectric Image Line
Sridhar Kanamaluru, Ming-yi Li, Kai Chang, Texas A&M University*

4:40 Simple Method for Analyzing Slot Antennas on Thick Dielectric Substrate
Aleksandar Nesic, Srdan Suvakov, Miodrag Mikavica, Institute of Microwave Techniques and Electronics*

Thursday PM AP Session 58 Salon D

Multiple Frequency and Wide Band Microstrip Patch Antennas

R. Mittra and D. I. Wu

1:20 Characteristics of a Stacked Microstrip Antenna With an Embedded Parasitic Element
Richard Q. Lee, NASA Lewis Research Center, Kai-Fong Lee, The University of Toledo*

1:40 Wideband Two-Layer Five-Patch Microstrip Antennas
K. F. Tong, T. M. Au, K. M. Luk, K. F. Lee, City University of Hong Kong*

2:00 Double C-Patch Antennas Having Different Aperture Shapes
Mohamed Sanad, Nokia Mobile Phones

2:20 Characteristics of Tri-plate Flat Antenna
K. Tsukamoto, Matsushita Electric Works Ltd., H. Arai, Yokohama National University*

2:40 Dual Band Cavity-Backed Quarter-Wave Patch Antenna
Amir Boag, Yuval Shimony, Alona Boag, Raj Mittra, University of Illinois*

3:00 BREAK

3:20 Dual-Frequency Microstrip Reflectarray
Doris I. Wu, Richard C. Hall, Boulder Microwave Technologies, John Huang, JPL*

3:40 A Dual-Band Microstrip Array Antenna
Tungshing Chan, Yeongming Hwang, The Chinese University of Hong Kong*

4:00 Rectangluar Micro Strip Antennas with Stub Along the Non-Radiating Edge for Dual Band Operation
Asha E. Daniel, Girish Kumar, I. I. T., Bombay

4:20 Tunable Dual and Triple Frequency Stub Loaded Rectangular Microstrip Antennas

A. E. Daniel, G. Kumar, IIT*

4:40 Patterns of Stacked Microstrip Patches Antenna
J. Xu, Beijing Astronomical Observatory

Thursday PM Joint/URSI-G Session 11 Salon E

Special Session

Transionospheric Propagation
L. M. Duncan and J. Goodman

1:20 A Non-deterministic Transionospheric Transfer Function for a Realistic Three-Dimensional Ionosphere
Marisa McCoy, John P. Basart, Iowa State University*

1:40 Effects of Ionospheric Scintillation on Differential Demodulation of GPS Data
Roger A. Dana, Mission Research Corporation

2:00 Mid-Latitude Angle of Arrival Data for Resolved Ionospheric Modes
W. M. Sherrill, Q. R. Black, B. Brown, Southwest Research Institute*

2:20 Synthetic Array Antenna and its Application to the Multipath Propagation Environment
A. H. Abu Bakar, MARA Institute of Technology

2:40 The Scintillation Index in an Inhomogeneous (on Average) Ionosphere with Random Large-Scale Irregularities
A. V. Kulizhsky, M. V. Tinin, Irkutsk State University

3:00 BREAK

3:20 Theoretical Modeling of the Chirp-Sonde Operation when Diagnosing the HF Radio Channel
N. V. Ilyin, V. V. Khakhinov, V. I. Kurkin, V. E. Nosov, S. N. Ponomarchuk, Institute of Solar-Terrestrial Physics*

3:40 The Harnessing of Complicated Signals for Measurements of the Signal Distortions in the Ionospheric Channel
A. V. Medvedev, K. G. Ratovsky, Institute of Solar-Terrestrial Physics*

4:00 Applied Program Packages for Prediction and Current Diagnostics of the HF Radio Channel
V. I. Kurkin, V. E. Nosov, S. N. Ponomarchuk, S. V. Pushkarev, Institute of Solar-Terrestrial Physics*

4:20 Model-Emperical Study of the HF Propagation During Magnetospheric Substorm

D. V. Blagoveshchensky, State Academy of Aerospace Instrumentation, T. D. Borisova, Arctic and Antarctic Scientific Research Inst.*

Thursday PM Joint/URSI-B Session 12 Trimaran/Brigantine

Rough Surfaces
G. S. Brown and Y. Kuga

1:20 Analytical and Experimental Studies of Backscattering of Electromagnetic Waves From High-Slope Rough Surfaces
Lynn Ailes-Sengers, Akira Ishimaru, Yasuo Kuga, University of Washington*

1:40 An Improved Kirchhoff Approximation for the Simulation of Electromagnetic Scattering from Rough Surfaces
Carlos Torres-Verdin, Tarek M. Habashy, Schlumberger-Doll Research*

2:00 Scattering of a Gaussian Beam by Roughened Sinusoidal Surfaces
David A. Kapp, Gary S. Brown, Virginia Polytechnic Institute & State University*

2:20 Application of FDTD to Periodic Surface Scattering Problems
B. Houshmand, Jet Propulsion Laboratory

2:40 Transient Scattering from a Periodic Sea Surface
A. Norman, D. P. Nyquist, E. J. Rothwell, K. M. Chen, Michigan State University*

3:00 BREAK

3:20 Bistatic Scattering Characteristics of Surface Waves on Dielectric Rough Surfaces
Hui Zhao, Yasuo Kuga, Akira Ishimaru, University of Washington*

3:40 Monte Carlo Simulation of Electromagnetic Scattering From Two-Dimensional Random Rough Surfaces
Robert L. Wagner, Jiming Song, Weng Cho Chew, University of Illinois*

4:00 Electromagnetic Scattering From Slightly Rough Surfaces With Inhomogeneous Dielectric Profile
Kamal Sarabandi, The University of Michigan

4:20 Non-Coherent Scattering From a Plasma Slab with a Rough Boundary
S. Shulga, O. Bagatskaya, N. Zhuck, Kharkov State University*

4:40 Infrared Extinction of the Powder of Brass 70Cu / 30An Modeled through

Random Process
Hsing-Yi Chen, I-Young Tarn, Yeou-Jou Hwang, Yuan-Ze Institute of Technology*

Thursday PM URSI-D Session 29 Salon 1/2

Microwaves - Photonics - Electronics
L. P. B. Katehi and M. Shur

1:20 Optical Beam Forming and Steering for Phased-Array Antenna
Dilip K. Paul, Brian J. Markey, Rajender Razdan, COMSAT Laboratories*

1:40 Time-Domain Numerical Analysis of Passive and Active Optical Microstructures
Rose M. Joseph, Susan C. Hagness, Allen Taflove, Northwestern University*

2:00 Photonic Bandgap Materials: New FDTD Analysis and Antenna Applications
James G. Maloney, Morris P. Kesler, Brian L. Shirley, Denver J. York, Georgia Tech Research Institute, Glenn S. Smith, Georgia Institute of Technology*

2:20 Macromodeling of Circuit Components for High Frequency Applications
Kavita Goverdhanam, Emmanouil Tentzeris, Linda P. B. Katehi, The University of Michigan*

2:40 An All Optical Millimeter-Microwave Generator
K. Daneshvar, University of North Carolina, L. Hales, Redstone Arsenal*

3:00 BREAK

3:20 Band-Pass Filters Mounted with Cube Dielectric Resonators in Cut-Off Waveguide
Sachihiro Toyoda, Takashi Murakami, Osaka Institute of Technology

3:40 A Novel Method for Suppressing Spurious Resonance Responses of the Coaxial-Resonator Bandpass Filters
Kouji Wada, Yasumasa Noguchi, Hideaki Fujimoto, Junya Ishii, Kinki University

4:00 A Power Amplifier Based on an Extended Resonance Technique
Adam Martin, Amir Mortazawi, Bernard C. De Loach, Jr., University of Central Florida*

4:20 An Active Ka-Band Antenna Element Amenable to Device Integration
D. J. Roscoe, Communications Research Centre, L. Shafai, University of Manitoba, M. Cuhaci, A. Ittipiboon, Communications Research Centre*

4:40 A Dynamical Analysis of the CMOS Circuit
Jilin Tan, Guangwen Pan, University of Wisconsin, MIlwaukee*

5:00 Optical Temperature Sensor Using Surface Plasmon Resonance Technique

Thursday PM URSI-B Session 30 Salon A

Numerical Methods
K. K. Mei and V. Jamnejad

1:20 A 3D High-Order Unstructured Finite-Volume Algorithm for Solving Maxwell's Equations
Yen Liu, NASA Ames Research Center

1:40 Three-Dimensional Calculations Using Impedance Matrix Localization
Francis X. Canning, Rockwell Science Center, Erik Rosen, SFA, Inc., Luise Schuetz Couchman, Naval Research Laboratory*

2:00 Confirming the Invariance of the Measured Equation of Invariance
Kenneth K. Mei, Yaowu Liu, City University of Hong Kong*

2:20 Finite-Difference Analysis of Circular Dielectric-Loaded Waveguides
Jenn-Ming Guan, Private China Junior College of Technology, Da-Chiang Chang, National Tsinghua University*

2:40 Implementation of an Infinite Ground Plane in a 2-D TLM Network
John B. Erwin, Stuart M. Wentworth, Auburn University*

3:00 BREAK

3:20 High-Frequency Asymptotic Reduction of the Fast Multipole Method
Robert J. Burkholder, Do-Hoon Kwon, Ohio State University*

3:40 Resource Management in Time-Domain Maxwell Solvers
A. H. Mohammadian, W. F. Hall, V. Shankar, Rockwell International Science Center*

4:00 Et-Ht FEM Modal Analysis of Transversely Periodic Waveguides
Eric W. Lucas, Thomas P. Fontana, Westinghouse Electric Corporation*

4:20 Degeneration of Rectangular and Triangular Rooftop Functions in the Discretisation of Planar Structures
Jeannick Sercu, University of Ghent, Niels Fache, HP-Belgium, Paul Lagasse, University of Ghent

4:40 An Unstaggered, Colocated Scheme for Solving Maxwell's Equations in Curvilinear Coordinates
Ramakrishna Janaswamy, Naval Postgraduate School, Yen Liu, NASA Ames Research Center*

5:00 Fast-Multipole-Method Solution of Two-Dimensional Conductor

Geometries
Levent Gurel, Bilkent University

Thursday PM URSI-B Session 31 Salon B

Boundary Conditions
F. X. Canning and W. A. Davis

1:20 Numerical Absorbing Boundary Conditions for the Scalar and Vector Wave Equations
Bruno Stupfel, Commissariat a l'Engergie Atomique, Raj Mittra, University of Illinois

1:40 Relationship Between Generalized Impedance Boundary Conditions and Absorbing Boundary Conditions
J. L. Volakis, T. B. A. Senior, S. Legault, University of Michigan*

2:00 Comparison of Some Absorbing Boundary Conditions for the FDTD-Method
J. De Moerloose, M. A. Stuchly, University of Victoria*

2:20 A Numerical Absorbing Boundary Condition for 3D Edge-Based Finite Element Analysis of Very Low Frequency EM Fields
Amir Boag, Israel Aircraft Industries, Raj Mittra, University of Illinois*

2:40 Complementary Operators: A Method to Annihilate Artificial Reflections Arising from the Truncation of the Computational Domain in the Solution of Partial Differential Equations
Omar M. Ramahi, Digital Equipment Corporation

3:00 BREAK

3:20 Solution Accuracy Limitations Due to Mesh Features and Boundary Conditions using Edge-based Finite Elements
Jay W. Parker, Cinzia Zuffada, Jet Propulsion Laboratory*

3:40 Functional Boundary Conditions for Variational Principles in Electrostatics
W. A. Davis, Virginia Polytechnic Institute and State University

4:00 Optimization of the Berenger PML for FD-TD Simulations
Christopher E. Reuter, Rome Laboratory/ERST, Rose M. Joseph, Northwestern University, Daniel S. Katz, Cray Research, Inc. Eric T. Thiele, University of Colorado, Allen Taflove, Northwestern University*

4:20 Wideband Absorbing Boundary Condition for FD-TD Simulations of

Waveguiding Structures in 3-D
Christopher E. Reuter, Rome Laboratory/ERST, Rose M. Joseph, Northwestern University, Daniel S. Katz, Cray Research, Inc., Eric T. Thiele, University of Colorado, Allen Taflove, Northwestern University*

Thursday PM URSI-B Session 32 Salon F

Special Session

Transient Electromagnetic Wave Propagation in Dispersive Media
S. L. Dvorak

1:20 FDTD with Linear Dispersion: Simulations of the Interaction of Optical Pulses with Realistic Metallic Gratings
Justin B. Judkins, Richard W. Ziolkowski, The University of Arizona*

1:40 Dispersive Media in FDTD Calculations
Raymond Luebbers, David Kelley, The Pennsylvania State University*

2:00 Radar-Type Transient EM Signals Scattered by Spherical Anomalies in Dispersive Media and Performance Tests for the Extended Born Approximation
Evert C. Slob, Delft University of Technology, Tarek M. Habashy, Carlos Torres-Verdin, Schlumberger-Doll Research*

2:20 Exact, Closed-Form Field Expressions for Transient Plane Waves Incident of Conductive Media (TM CASE)
Hsueh-yuan Pao, Hughes Missile Systems Company, Steven L. Dvorak, Donald G. Dudley, University of Arizona

2:40 Asymptotic Description of Transient Electromagnetic Wave Propagation in Lossy Dispersive Media
Kurt. E. Oughstun, University of Vermont

Thursday PM URSI-B Session 33 Schooner/Sloop

Theoretical Electromagnetics II
O. B. Kesler and E. V. Jull

1:20 Slot Antenna on Perfectly Conducting Spheroid Coated with Homogeneous Materials
A. A. Sebak, M. Zhang, University of Manitoba*

1:40 Simple Scattering Analysis of Finite Periodic Structure Boundaries
Jacob J. Kim, Oren B. Kesler, Texas Instruments*

2:00 Off-Bragg Blazing with Rectangular Gratings: New Results
Wei Chen, D. G. Michelson, E. V. Jull, University of British Columbia*

2:20 Quasi-addition Expression for Thin Spheroids
T. Do-Nhat, R. H. MacPhie, University of Waterloo*

2:40 Deflection Angle of a Light Ray Due to the Effects of Both Gravitational and Electrostatic Fields of a Charged Body
T. Do-Nhat , University of Waterloo*

3:00 BREAK

3:20 The Scattering of Waves by a Spheroidal Cavity-Backed Aperture
Elena D. Vinogradova, Institute of Radiophysics & Electronics of the National Academy of Sciences of the Ukraine

3:40 Electromagnetic Wave Scattering by Wire Antennas with a Local Nonlinear Load at the Presence of Two Media
A. A. Gorbachev, T. M. Zaboronkova, S. P. Tarakankov, Radiophysical Research Institute

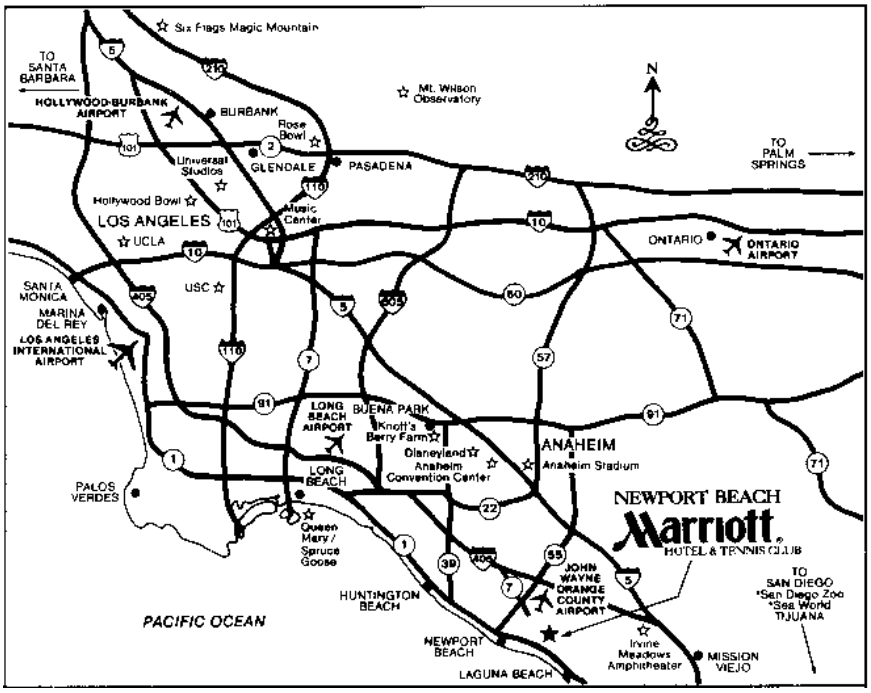
4:00 Bistable Regime of Surface Magnetoplasmon-Polariton Modes Excitation in Kretschmann Configuration
K. N. Ostrikov, N. A. Azarenkov, O. A. Osmayev, Kharkov State University & Scientific Centre for Physical Technologies*

4:20 Capabilities to Control Spurious Radiation of Antennas with Nonlinear Elements
Y. S. Shifrin, A. I. Luchaninov, V. M. Shokalo, Kharkov State Technical University of Radio Electronics*

4:40 Analysis of Circular Dielectric Waveguide with Periodically Varying Cross-section by Effective Cross-section Approach
Protap Prammanick, Abbas Mohannadi, The University of Saskatchewan*

Maps

Freeway map



Directions to Newport Beach Marriott

From John Wayne Airport — Orange County

Take MacArthur south to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

From Los Angeles International Airport

Take San Diego Freeway (405) south to Corona del Mar Freeway (73). Exit on Corona del Mar Freeway, toward Corona del Mar. Continue on to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

From Long Beach Airport

Take San Diego Freeway (405) south to Corona del Mar Freeway (73). Exit on Corona del Mar Freeway, toward Corona del Mar. Continue on to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

From Ontario International Airport

Take San Bernardino Freeway (10) west to Orange Freeway (57). Take Orange Freeway south to Santa Ana Freeway (5). Take Santa Ana Freeway south to Newport Freeway (55). Take Newport Freeway south to Corona del Mar Freeway (73). Exit on Corona del Mar Freeway, toward Corona del Mar. Continue on to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

From Los Angeles Downtown

Take Santa Ana Freeway (5) south to Newport Freeway (55). Take Newport Freeway south to Corona del Mar Freeway (73). Exit on Corona del Mar Freeway, toward Corona del Mar. Continue on to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

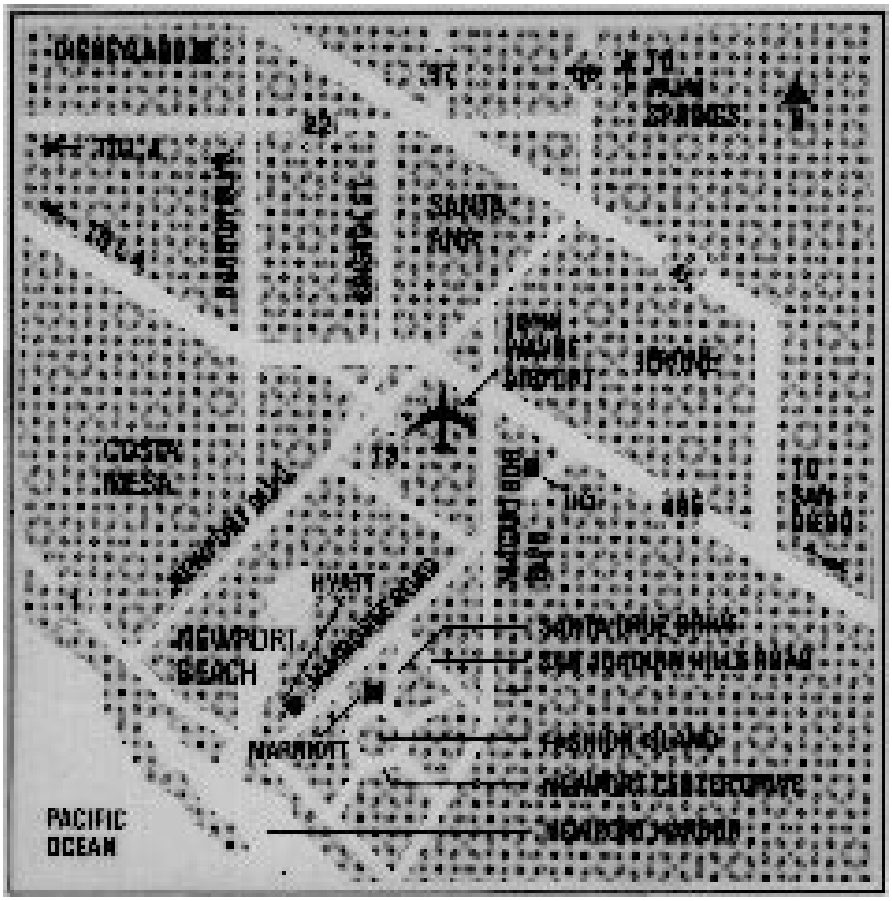
From San Bernadino/Riverside

Take Riverside Freeway (91) south to Newport Freeway (55). Take Newport Freeway south to Corona del Mar Freeway (73). Exit on Corona del Mar Freeway, toward Corona del Mar. Continue on to Jamboree Road. Turn right on Jamboree Road. Continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

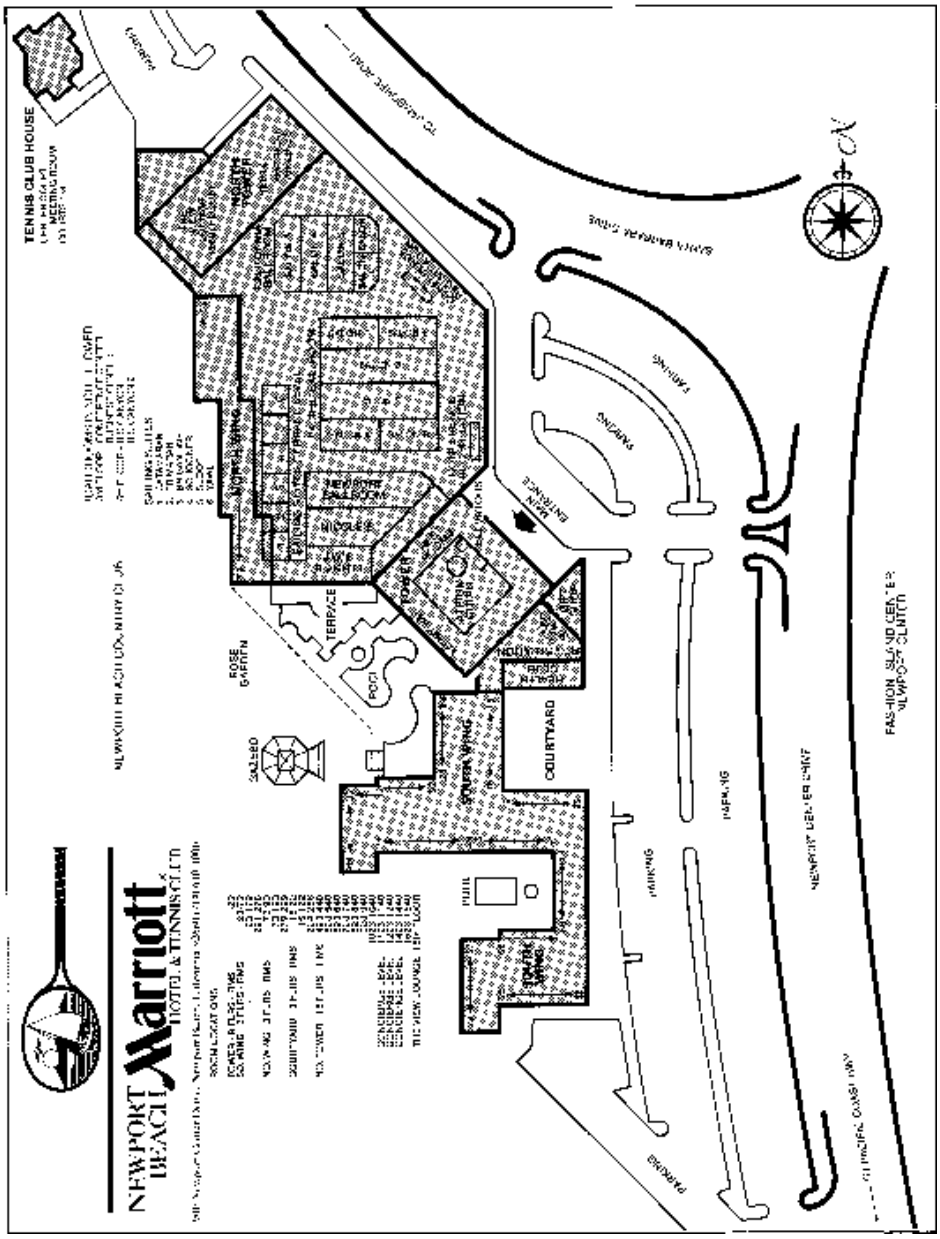
From San Diego

Take San Diego Freeway (405) north to Jamboree Road Exit. Turn left, continue down Jamboree Road to Santa Barbara Drive. Turn left on Santa Barbara Drive. Hotel will be on the right at the top of the hill.

Site Map



Hotel Map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COURTYARD
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Notes

Notes

Symposium Registration Form

Please type or print.

☐ Prof. ☐ Dr. ☐ Mr. ☐ Ms.

Last Name (Surname / Family Name) First Name (for name badge) M.I.

Name as it is to appear on badge _____

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Session Registration

	Member		Non-Member		
	Before May 12	**After** May 12	**Before** May 12	**After** May 12	**Fee Enclosed**
☐ AP-S* and URSI	$265	$315	$325	$375	$ _____
☐ AP-S Only*	$235	$285	$295	$345	$ _____
☐ Student**	$65	$115	$95	$145	$ _____
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☐ URSI Only	$225	$275	$225	$275	$ _____

Extra Digests (Indicate number) ____ APS @ $50 ____ URSI @ $20 $ _____

Total Registration and Digest Fees **$** _____

* Non-member fee includes $60 ($30 student) applicable toward part of IEEE membership dues if application is made during the Symposium.

** Proof of status required; Digest is included. Per IEEE policy, Life Members are admitted free, but do not receive digests

Please detach all forms along perforation, complete and mail all pages to:

1995 AP-S/URSI Symposium
2973 Harbor Blvd - 521
Costa Mesa, CA 92626-3989

Short Courses* (Friday, June 23, 1995)

		Before May 12	After May 12	Fee Enclosed
☐ C1	Array Signal Processing Techniques Applied to Antenna Applications	$175	$200	$ _____
☐ C2	Photonics in Antenna Applications	$175	$200	$ _____
☐ C3	Slotted Wave Guide Array Antennas	$175	$200	$ _____
☐ C4	Application of Finite Element Methods to Electromagnetics	$175	$200	$ _____
☐ C5	Hybrid Method of Moments for Electromagnetics	$175	$200	$ _____
☐ C6	Satellite Communication Systems	$175	$200	$ _____
☐ C7	Terrestrial Personal Communication Systems	$175	$200	$ _____

Workshops* (Friday, June 23, 1995)

☐ W1	Design for Integrated Circuit Antennas	$175	$200	$ _____
☐ W2	Intellectual Property Workshop	$100	$125	$ _____

Special Luncheon Workshop* (Tuesday, June 20, 1995)

☐ W3	Wideband Vivaldi Notch Antennas and Arrays	$25	$25	$ _____

Total Short Courses/Workshop Fees **$** _____

***Attendees must register for the symposium.**

Sporting Events *(Please indicate if you wish to participate in the following events)*

☐ S8 Golf Tournament (Friday June 23,1995)

☐ S9 Evening Tennis Tournament

Souvenir T-shirts

Number of T-shirts ordered in each size: T-shirts x $15 = $ _____

_____ + _____ + _____ + _____

Small Medium Large X-Large Total # _____

Social Events (Prices include round trip motor coach from headquarters hotel)

Evening Social Events

☐ S1 Beach Party & BBQ at Newport Dunes, Tues. 6pm–10pm
$40 x _____ persons = $ _____

☐ S2 Awards Banquet, Wed. 6pm–11pm
$55 x _____ persons = $ _____

Daytime Social Events

☐ S3 San Juan Capistrano Mission, Mon. 10 am–3pm
$36 x _____ persons = $ _____

☐ S4 Universal Studios, Tues. 9 am–5pm
$60 x _____ adults + $55 x _____ children (3-11) = $ _____

☐ S5 RMS Queen Mary Tour, Tues. 10am–3pm
$25 x _____ persons = $ _____

☐ S6 Newport Harbor Cruise, Wed. 11am–4pm
$31 x _____ persons = $ _____

☐ S7 Disneyland, Thur. 9am–5pm
$68 x _____ adults + $60 x _____ children (3-11) = $ _____

Total Daytime and Evening Social Events **$** _____

Symposium Registration Total

Total Registration and Digest Fees $ _____

Total Short Courses / Workshop Fees $ _____

Total Souvenir T-shirts $ _____

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TOTAL REGISTRATION FEES **$** _____

(Enter this total on Symposium Registration Payment Method)

☐ Check here if you are making your hotel reservations directly through the hotel.

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(Payment must accompany registration form). Accepted in U.S. currency only; funds must be drawn on a U.S. bank

☐ Check, bank draft or money order, payable to
1995 IEEE AP-S/URSI Symposium

☐ Visa ☐ Mastercard *(Only Visa or Mastercard Accepted)*

Credit card number _____ Expiration date _____

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Hotel Registration Form

Hotel Reservation deadline is May 28, 1995

Hotel registration fees are separate from Symposium registration fees and must be submitted separately using this form.

Newport Beach Marriott Hotel (Headquarters Hotel)
Hotel Choice:

☐ Single Room $130 1st

☐ Double Room $130 2nd

Hyatt Newporter Hotel (1.3 miles from meetings – shuttle available) Room Preference

☐ Single Room $89 ☐ Smoking ☐ Non-Smoking

☐ Double Room $89

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Roommate Request

Arrival Date _____ at ☐ AM ☐ PM

Departure Date _____

We will make every effort to accommodate your first choice. Note check-out time is 12 noon. Rooms may not be available for check-in until 4 p.m. *Proof of student/retired person status required at room reservation. Deposit of $130 required with reservation. Deposit may be made by personal check or money order drawn against a U.S. Bank, **U.S. Currency Only**, payable to **IEEE AP-S /URSI Symposia** or by credit card.

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☐ Check or money order enclosed payable to 1995 IEEE AP-S/URSI Symposium (in U.S. dollars only)

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Credit Card Number _____

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If you choose to phone the Newport Beach Marriott Hotel or the Hyatt Newporter directly, *be sure to so indicate on your registration form*, and *remember to identify yourself as a participant in the IEEE/URSI Conference*, both to receive the group rates and to insure that your reservation is counted toward the conference minimum.